Environmental Protection Agency

FY 2001 Annual Performance Plan and Congressional Justification

Clean Air

Strategic Goal: The air in every American community will be safe and healthy to breathe. In particular, children, the elderly, and people with respiratory ailments will be protected from health risks of breathing polluted air. Reducing air pollution will also protect the environment, resulting in many benefits, such as restoring life in damaged ecosystems and reducing health risks to those whose subsistence depends directly on those ecosystems.

Resource Summary
(Dollars in thousands)

		FY 1999	FY 2000	FY 2001	FY 2001 Req. v.
Goal 01	**Clean Air**	**$535,284.5**	**$540,965.5**	**$647,514.2**	**$106,548.7**
Obj. 01	Attain NAAQS for Ozone and PM	$387,110.4	$382,105.9	$455,169.9	$73,064.0
Obj. 02	Reduce Emissions of Air Toxics	$89,966.2	$95,123.4	$132,939.4	$37,816.0
Obj. 03	Attain NAAQS for CO, SO2, NO2, Lead	$40,071.7	$44,103.4	$39,111.4	($4,992.0)
Obj. 04	Acid Rain	$18,136.2	$19,632.8	$20,293.5	$660.7
	Total Workyears	1,751.4	1,857.9	1,856.6	(1.3)

Background and Context

Despite concerted efforts to achieve cleaner, healthier air, air pollution continues to be a widespread public health and environmental problem in the United States, contributing to illnesses such as cancer and to respiratory, developmental and reproductive problems. In many cases, air pollutants end up on the land or in rivers, lakes, and streams, harming the life in them. Air pollution also makes soil and waterways more acidic, reduces visibility, and accelerates corrosion of buildings and monuments.

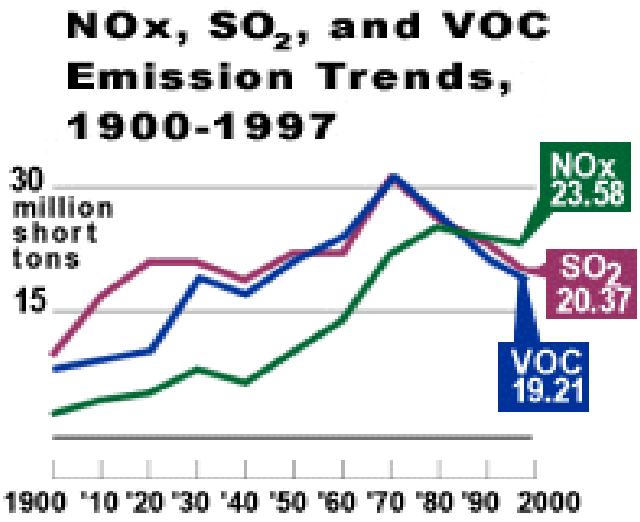
EPA is responding to air pollution because the problem is national and international in scope. Air pollution regularly crosses local and state lines and, in some cases, crosses our borders with Canada and Mexico. This causes problems not only for the majority of the population that lives in expanding urban areas but also for less populated areas and national parks. Federal assistance and leadership are essential for developing cooperative state, local, tribal, regional, and international programs to prevent and control air pollution and for ensuring that national standards are met.

Means and Strategy

Criteria pollutants. EPA develops standards to protect public health and the environment that limit concentrations of the most widespread pollutants (known as criteria pollutants), which are linked to many serious health and environmental problems:

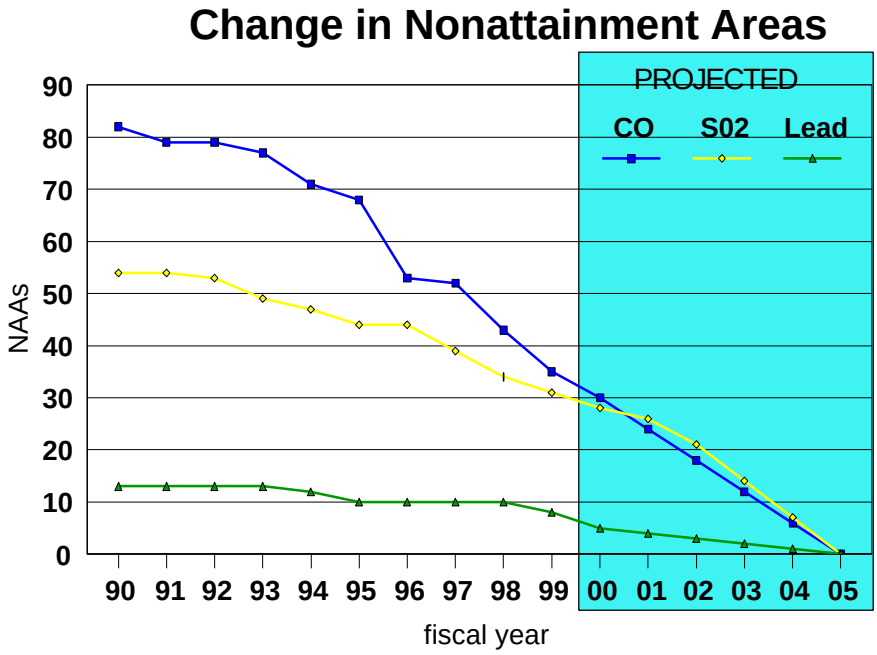
- Ground-level ozone. Causes respiratory illness, especially in active children; aggravates respiratory illnesses such as asthma; causes damage to vegetation and contributes to visibility problems.
- Sulfur dioxide (SO_2). Aggravates the symptoms of asthma and is a major contributor to acid rain.
- Nitrogen dioxide (NO_2). Irritates the lung and contributes to the formation of ground-level ozone, acidic deposition, and visibility problems.
- Carbon monoxide (CO). Interferes with the delivery of oxygen to body tissues, particularly affecting people with cardiovascular diseases.
- Lead. Causes nervous system damage, especially in children, leading to reduced intelligence.
- Particulate matter (PM). Linked to premature death in the elderly and people with cardiovascular disease and to respiratory illness in children; affects the environment through visibility impairment.

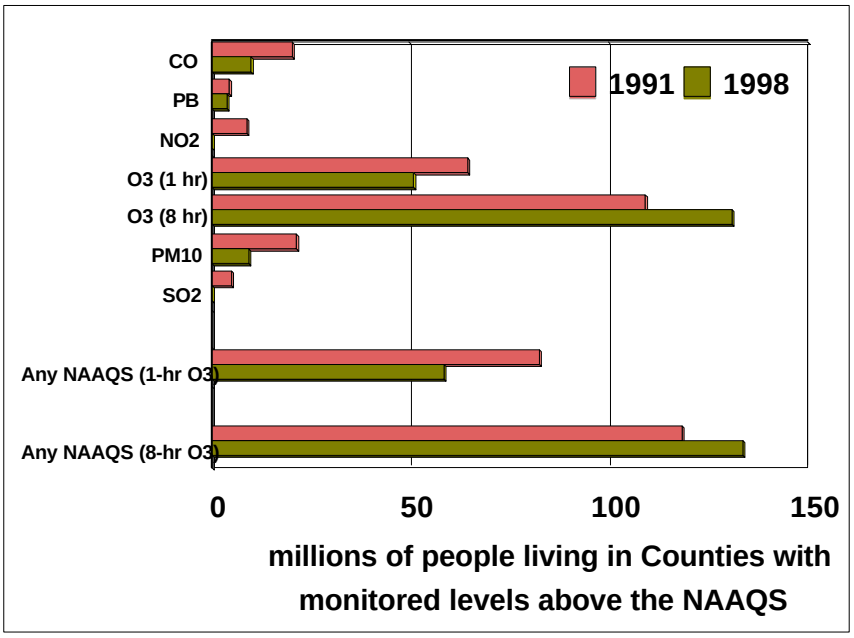
Hazardous air pollutants. Hazardous air pollutants (HAPs), commonly referred to as air toxics or toxic air pollutants, are pollutants that cause, or may cause, adverse health effects or ecosystem damage. The Clean Air Act Amendments of 1990 list 188 pollutants or chemical groups as hazardous air pollutants and targets sources emitting them for regulation. Examples of air toxics include heavy metals such as mercury and chromium, dioxins, and pesticides such as chlordane and toxaphene. HAPs are emitted from literally thousands of sources including stationary as well as mobile sources. Adverse effects to human health and the environment due to HAPs can result from exposure to air toxics from individual facilities, exposures to mixtures of pollutants found in urban settings, or exposure to pollutants emitted from distant sources that are transported through the atmosphere over regional, national, or even global airsheds.



Compared to information for the criteria pollutants, the information about the potential health effects of HAPs (and their ambient concentrations) is relatively incomplete. Most of the information on potential health effects of these pollutants is derived from experimental animal data. Of the 188 HAPs mentioned above, almost 60 percent are classified by EPA as known, probable, or possible carcinogens. One of the more documented ecological concerns associated with toxic air pollutants is the potential for some to damage aquatic ecosystems. Deposited air pollutants can be significant contributors to overall pollutant loadings entering water bodies.

Acid rain. The Clean Air Act Amendments of 1990 established a program to control emissions from electric power plants that cause acid rain and other environmental and public health problems. Emissions of SO_2 and nitrogen oxides (NO_x) react in the atmosphere and fall to earth as acid rain, causing acidification of lakes and streams and contributing to the damage of trees at high elevations. Acid deposition also accelerates the decay of building materials and paints and contributes to degradation of irreplaceable cultural objects such as statues and sculptures. NO_x emissions are a major precursor of ground-level ozone, which affects public health and damages crops, forests, and materials. Additionally, NO_x deposition contributes to eutrophication of coastal waters, such as the Chesapeake and Tampa Bays. Before falling to earth, SO_2 and NO_x gases can form fine particles that may ultimately affect public health by contributing to premature mortality, chronic bronchitis, and other respiratory problems. The fine particles also contribute to reduced visibility in national parks and elsewhere.

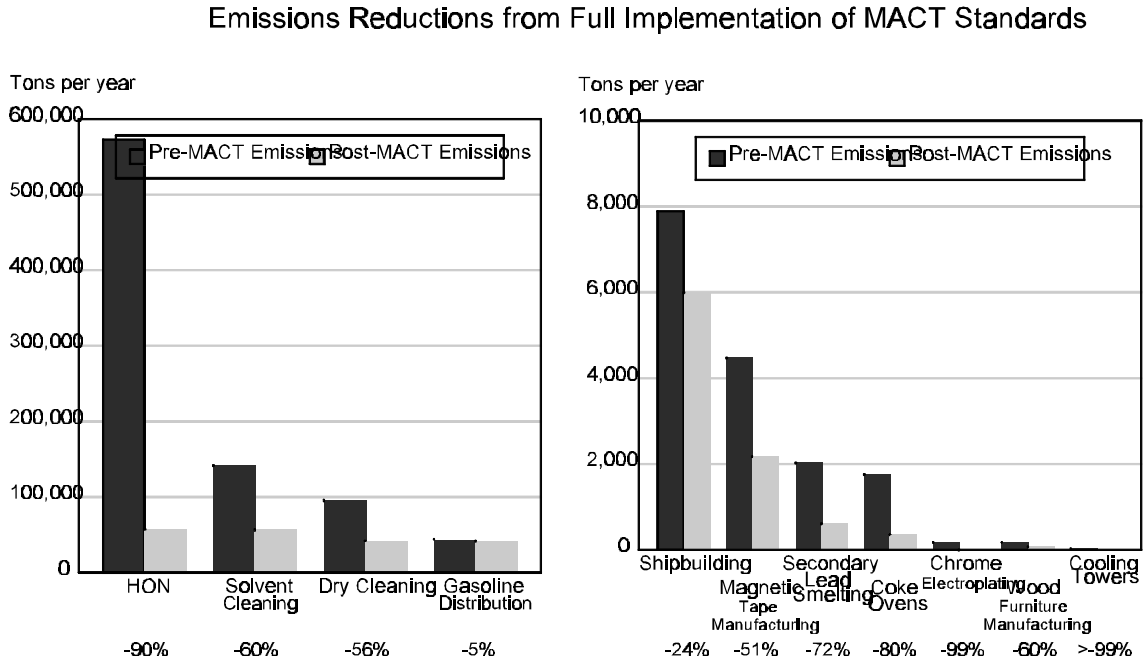




Air quality has continued to improve during the past 10 years for all six pollutants. Nationally, air quality concentration data taken from thousands of monitoring stations across the country has continued to show improvement since the1980s for ozone, PM, CO, NO_2, SO_2, and lead.

In fact, all the years throughout the 1990s have shown better air quality than any of the years in the 1980s. This steady trend of improvement resulted in spite of weather conditions in the 1990s which were generally more conducive to higher pollution levels, especially ground-level ozone formation. Emissions of hazardous air pollutants have also been reduced significantly. Actions since the Clean Air Act was amended in 1990, have reduced air toxic emissions by over 1 million tons annually, a greater than 25 percent reduction. The primary programs responsible for the reductions include the Maximum Achievable Control Technology (MACT) standards and the reformulated gasoline programs.

Air Toxics Reductions



The dramatic improvements in emissions and air quality occurred simultaneously with significant increases in economic growth and population. The improvements are a result of effective implementation of clean air laws and regulations, as well as improvements in the efficiency of industrial technologies.

While substantial progress has been made, it is important not to lose sight of the magnitude of the air pollution problem that still remains. Despite great progress in air quality improvement, in 1998 there were still approximately 59 million people nationwide who lived in counties with monitored air quality levels that did not meet the primary National Ambient Air Quality Standards (NAAQSs) set to protect public health.

On May 14, 1999, the U.S. Court of Appeals for the District of Columbia Circuit issued an opinion (modified on October 29, 1999) that calls into question EPA's ability to adopt and enforce the new ozone and PM NAAQSs that were issued in July 1997. EPA strongly disagrees with this decision and, with the Department of Justice, has filed a petition asking the Supreme Court to overturn the decision. The case does not affect the pre-existing NAAQS, which have not yet been met in a number of areas.

To continue to reduce air pollution, the Clean Air Act sets specific targets for the mitigation of each air pollution problem. The Act also mandates the air quality monitoring that helps us measure progress. In addition, the Act lays out a specific roadmap for achieving those goals - what we the Agency and our partners -- states, tribes, and local governments -- have to do to clean up the air. One constant across the titles in the Act is that the pollution control strategies and programs it contains are all designed to get the most cost-effective reductions early on. The early reductions program in toxics, Phase 1 of the Acid Rain program, Tier I auto emission standards, more stringent standards on diesel exhaust from trucks and buses, the reformulated gasoline program, and the MACT standards program were all designed to achieve early reductions, making our air cleaner and safer to breathe. The problems that remain are some of the most difficult to solve.

We have developed strategies to address this difficult increment and overcome the barriers that have hindered progress in clean air in the past. We will use the flexibility built into the Clean Air Act, which is not wedded to hard and fast formulas or specific technological requirements.

We will focus our efforts on:

- Coupling ambitious goals with steady progress - The emphasis will be on achieving near-term actions towards meeting the standards, while giving states, tribes, and local governments time to come up with more difficult measures. We recognize that it will be difficult for some areas of the country to attain the new NAAQSs for ozone and fine particles, and we believe it will take more than individual state efforts to achieve the needed emission reductions. We will work with states, tribes, and local governments to identify ways to achieve interim reductions, principally through regional strategies, national measures, and the air toxics and acid rain programs by building on cross-pollutant emission reductions.

  Using these strategies gets steady progress toward the goal and for many areas will achieve the goal. For those areas where additional measures are required, this work will allow steady progress toward the goal while providing the time to identify measures that will get that last increment to fully achieve the goal.

- Maintaining accountability with flexibility - Ensuring that there is no backsliding in the progress already made to meeting the Clean Air goal is critical. We will also use the Act's flexibility to develop innovative measures such as the NO_x trading program (which builds on the acid rain program) to help states, tribes, and local governments reduce ozone precursor emissions at the lowest cost. Under innovative provisions of Title II, EPA for the first time established vehicle emission standards and fuel quality standards simultaneously.

- Promulgating regulations which maximize emission reductions while giving consideration to cost, lead time, safety, and energy impacts - EPA will review existing standards where appropriate to ensure the long-term goals of the Clean Air Act are met.

- Fostering technical innovations where they provide clear environmental benefits - Market-based approaches provide "niches" for many types of technologies; no one size will fit all. Sources can improvise, innovate, and otherwise be creative in reducing emissions. We will promote such technological innovation and then disseminate it to others to show how they can get needed reductions.

- Building partnerships - There are numerous forms of partnerships, all of which we have used at one point or another in implementing the Clean Air Act: using public outreach to educate people on air problems and encourage them to work to solve them; involving broad-based groups, such as the multi-state Ozone Transport Assessment Group, to study a problem and provide recommendations to EPA on ways to solve it; working with organizations like the National Academy of Sciences (NAS) on both short-term and long-term research priorities; and engaging in regulatory negotiations to bring stakeholders to work on a problem and address a specific regulatory issue. We will continue to use these types of partnerships as appropriate to implement the Clean Air Act.

- Anticipating upcoming issues and ensuring that research is underway in those areas. For instance, the Agency is seeking to better understand the root causes of the environmental and human health problems created by air toxics in urban areas, thereby improving the ability to weigh alternative strategies for solving those problems. Research will be devoted to the development of currently unavailable health effects and exposure information to determine risk and develop alternative strategies for maximizing risk reductions. Based on this research we will be able to model and characterize not only the current toxics risks and compare national program alternatives, but also identify regional and local "hot spots," and model alternative strategies to assist states and localities in solving their air and water toxics problems.

Using these strategies, we will work with areas that have the worst problems to develop strategies accounting for unique local conditions that may hinder them from reaching attainment. We also will work with states, tribes, and local governments to ensure that work they are doing on the PM and ozone standards effectively targets both pollutants, as well as regional haze, to maximize the effectiveness of control strategies. On the national level, we will continue to establish Federal standards to require cleaner motor vehicles, fuels and non-road equipment that are cost effective and technically feasible. We also will target source characterization work, especially development and improvement of emission factors, that is essential for the states, tribes and local agencies to develop strategies to meet the standards. We will look closely at urban areas to determine the various sources of toxics that enter the air, water, and soil and determine the best manner to reduce the total toxics risk in these urban areas. We will also focus on research that would inform and enhance our regulatory decisions as well as research that would explore emerging areas.

Research

To reach the objective of attaining the NAAQS for tropospheric ozone, additional research is planned to improve current models of emissions and atmospheric processes in order to identify effective control strategies. In 2001, EPA will develop tropospheric ozone precursor measurements methods, emissions-based air quality models, observation based modeling methods, and source emissions information to guide State Implementation Plan (SIP) development under the current NAAQS. In support of Agency efforts to attain the NAAQS for PM, in 2001, research will provide new information on the atmospheric concentrations, human exposure, health effects and mechanisms of toxicity of particulate matter, and will facilitate PM NAAQS review through the development and consultation process involved in the formulation of a PM Air Quality Criteria Document.

Air toxics research will seek to understand further the root causes of the air toxics environmental and human health problems in urban areas, thereby improving the ability to weigh alternative strategies for solving those problems. Efforts will focus on providing new information and methods to estimate human exposure and health effects from high priority urban air toxics, as well as on completing health assessments for the highest priority hazardous air pollutants, including fuel/fuel additives. With this information the Agency will be in a better position to determine risk and develop alternative strategies for maximizing risk reductions.

Strategic Objectives and FY 2001 Annual Performance Goals

Objective 01: Attain NAAQS for Ozone and PM

- Provide new information on the atmospheric concentrations, human exposure, health effects and mechanisms of toxicity of particulate matter, and facilitate PM NAAQS review through Air Quality Criteria Document development and consultation.

- Maintain healthy air quality for 33.4 million people living in 43 areas attaining the ozone standard; increase by 1.9 million the number of people living in areas with healthy air quality that have attained the standard; and certify that 5 new areas have attained the 1-hour standard for ozone.

- EPA will develop the infrastructure to implement the Clean Air Partnership Fund, which will demonstrate smart multi-pollutant approaches that reduce greenhouse gases, air toxics, soot, and smog.

- Maintain healthy air quality for 1.26 million people living in 13 areas attaining the PM standards, and increase by 60 thousand the number of people living in areas with healthy air quality that have attained the standard.

Objective 02: Reduce Emissions of Air Toxics

- Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 5% from 2000 (for a cumulative reduction of 35% from the 1993 level of 4.3 million tons per year.)

Objective 03: Attain NAAQS for CO, SO2, NO2, Lead

- Maintain healthy air quality for 28.8 million people living in 62 areas attaining the CO, SO2, NO2, and Lead standards, and increase by 16.4 million the number of people living in areas with healthy air quality that have attained the standard.

Objective 04: Acid Rain

- 5 million tons of SO2 emissions from utility sources will be reduced from the 1980 baseline.
- 2 million tons of NOx from coal-fired utility sources will be reduced from levels before implementation of Title IV of the Clean Air Act Amendments.

Highlights

Ozone/Particulate Matter/Regional Haze

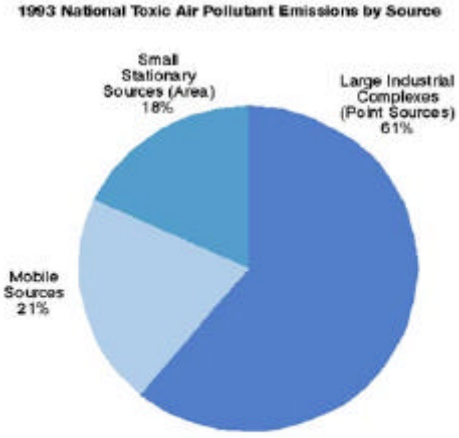
Ground-level ozone, fine PM and regional haze have many similarities. All three problems result from their formation under certain atmospheric conditions in the presence of gases, such as NOx and VOCs, emitted by the same types of sources. Because of these similarities, there are opportunities for integrated strategies for reducing pollutant emissions in the most cost-effective ways.

In 2001, EPA will assist states, tribes and local governments in devising additional stationary source and mobile source strategies to reduce ozone and particulate matter. Some specific activities and initiatives in this program will include:

- Implementation of reinstated 1-hour ozone NAAQS B Develop and approve measures to attain and maintain the 1-hour standard for nonattainment areas. Redesignate areas that meet standards to attainment.
- Completion of the process for designation of attainment and nonattainment areas for the 8-hour ozone NAAQS;
- Using the Clean Air Partnership Fund, demonstration of smart, multi-pollutant strategies that reduce ozone, PM, and other pollutants, including greenhouse gases.
- Implementation of ozone control measures through an Economic Incentive Program.
- Continuation of outreach efforts to promote public awareness of the Air Quality index and the effects of pollution.
- Continued implementation of the PM-10 standards, including the collection and review of air quality data, processing state clean air plans, and redesignating areas with clean air.
- Development and implementation of standards, plans, strategies, and actions to preserve air quality and prevent further degradation in areas with the potential to be designated nonattainment in the future.
- Development and refinement of analysis tools for use by states and tribes, including for development of mobile and stationary source emissions data and inventories.

- Implementation of the Tier 2 vehicle and fuel regulations. The Agency will make substantial investment in developing and evaluating new technologies to reduce PM emissions from diesel engines, including engine design enhancements, alternative after-treatment controls and fuel reformulations.

- Demonstration of the feasibility of diesel-engine control technology, as recently done for gasoline powered sports utility vehicles as part of the Tier 2 rulemaking. Laboratory capabilities will be upgraded to keep pace with rapidly changing control technology, emissions reductions, and measurement needs and technology.



According to National Toxics Inventory data, smaller stationary sources account for 18 percent of U.S. toxic emissions, mobile sources account for 21 percent, and larger industrial sources for 61 percent.

- Investigation and characterization of particulate formation during the combustion process, the impact of known trends in vehicle engine design and after treatment control techniques, and determination of the leading edge opportunities for additional controls.

- Assessments of the emission control potential of vehicles powered by technologies such as lean-burn and/or fuel-efficient technologies, including diesel engines equipped with advanced after-treatment systems, gasoline direct injection engines, and other technologies that show promise for significant advances in fuel economy and meeting the Tier 2 standards in the post-2004 time frame. In this assessment the Agency will maintain a "systems" perspective, considering the progress of advanced vehicle technologies in the context of the role that sulfur in fuels plays in enabling the introduction of these advanced technologies or maximizing their effectiveness.

- Initiation of in-use performance evaluations of national low emission vehicles (NLEVs) sold in northeast states to determine durability, predictive value for Tier 2, and potential recall for any emission system defects;

- Expansion of the efforts of EPA's Transportation Air Quality (TRAQ) Center in assisting state and local communities in developing transportation strategies and voluntary mobile source programs that respond to unique local conditions so that attainment can be reached. Specifically, the TRAQ Center will provide transportation program information and tools, technical assistance, key contacts and funding sources, and partnership opportunities.

- EPA will also operate the NO_X Allowance and Emissions Tracking Systems for the NO_X Budget Program, as requested by the 12 States of the Ozone Transport Region. The Acid Rain Program will also administer the Emission and Allowance Tracking Systems for a NO_X reduction program involving emissions trading across 22 States.

- Evaluation of state and tribal particulate monitoring.

- Working with states and tribes on technical analyses and activities related to regional planning and developing state and tribal implementation plans

<u>Targeting Air Toxics Risks in Urban Areas</u>

In FY 2001, EPA will develop strategies and rules to help states reduce emissions and exposure to hazardous air pollutants, particularly in urban areas, and reduce harmful deposition in water bodies. Some specific activities and initiatives in this program include:

- Promulgating 25 MACT standards and a rule for heavy-duty highway diesel vehicles and cleaner diesel fuel;

- Ensuring compliance with the promulgated MACT standards including developing implementation tools for 10 MACT standards and building tribal capacity to address air toxics.

- Implementing an ambient air toxics measurement and monitoring program to better quantify ambient air toxic levels and characterize human exposures; updating and improving the National Toxics Inventory; evaluating and improving models of the impacts of air toxics on a national scale;

- In partnership with states, enhancing and expanding the existing toxics monitoring network, which will be implemented through a peer-reviewed strategy developed with the states. Soliciting HAP emission inventory information from states to improve the National Toxics Inventory.

- Completing residual risk assessments for all 2-year MACT standards; continuing residual risk assessments for all 4-year MACT standards;

- Completing regulatory determinations for electric utilities;

- Evaluating the need for further regulations to control mobile source air toxics as required by section 202(l) of the Clean Air Act and promulgating regulations if needed and appropriate.

- Implementing the reformulated gasoline program in areas of 17 states and the District of Columbia.

- Using the Clean Air Partnership Fund to demonstrate smart, multi-pollutant strategies that reduce air toxics and other pollutants.

Carbon Monoxide, Lead, Nitrogen Oxide and Sulfur Dioxide

For all NAAQS pollutants, we will continue to redesignate areas to attainment as they meet the standards, carry out the regular review of the NAAQS using the most current science, and ensure the maintenance of NAAQSs in areas that have clean air. For the CO, SO_2, NO_x and lead NAAQSs, there are some states that have areas that cannot meet the standards because of some particular, source-specific problem. These sources are often high-profile and critical to the local economy. We will work cross-Agency to develop strategies that help them to comply while being sensitive to economic and other issues.

EPA has established a permitting program, run by the states, for air emission sources to bring all the regulatory requirements of a plant into one unified operating permit document. There are also permit programs for preconstruction review of facilities. EPA will continue to simplify and streamline the rules and guidance in implementing these programs to simplify their use by the industrial sources.

Acid Rain

In FY 2001, Phase II of the Acid Rain Program will be in its second year of operation, affecting 2,000 industrial and utility sources. The Program also intends to launch a multi-year effort to re-engineer the information technology support structure in order to meet current and future needs, including increased emissions reporting and verification, and allowance trading activities.

Research

EPA's Tropospheric ozone research program is focused on developing information, methods, models and assessments to support implementation of the current ozone NAAQS and the required review of the standard every five years. This research will produce an initial external review draft of the ozone Air Quality Criteria Document (AQCD) for public comment and Clean Air Scientific Advisory Committee (CASAC) review, which will help guide State Implementation Plans (SIPs) on the current NAAQS. In 2001, the Particulate Matter Research Program will complete the final PM AQCD, in addition to completing data collection for a PM longitudinal panel study. Efforts will also focus on completing a report on health effects of concentrated ambient PM in healthy animals and humans, in asthmatic and elderly humans, and in animal models of asthma and respiratory infection. This new information will help move the Agency toward its objective of reducing Americans' exposure to harmful particulate matter.

Air toxics research will provide effects information, as well as the exposure, source characterization, and other data to quantify existing emissions, key pollutants, and strategies for cost effective risk management. In FY 2001, air toxics research will focus on completing three draft toxicological reviews and assessments of high priority air toxics for external review as well as validating a physiologically-based model for neurotoxic air toxics and developing microenvironment and neighborhood scale exposure models. These products will yield new information that will be essential to effectively and efficiently decreasing future risk to the American public through reduced air toxics emissions.

External Factors

Stakeholder Participation

To achieve our collective goal of healthy, clean air, EPA relies on the proactive cooperation of federal, state and local government agencies, industry, non-profit organizations, and individuals. Our success is far from guaranteed even with the full participation of all our stakeholders. EPA has significant work to accomplish just to reach its annual targets that support the longer term health and environmental outcomes and improvements that are articulated in the Clean Air goal. Meeting the Clean Air goal necessitates a strong partnership among all the stakeholders but in particular, among the states and EPA, the Environmental Council of States, and the State and Local Air Pollution Control Officials. And, as we move into the 21st century, EPA will be working with our various stakeholders to encourage new ways to meet the challenges of "cross regional" issues as well as to integrate our programs to holistically address airborne pollutants.

Environmental Factors

In developing clean air strategies, states and local governments must consider normal meteorological patterns. Meteorological conditions often control the formation and buildup of pollutants in ambient air. For example, peak ozone concentrations typically occur, during hot, dry, stagnant summer-time conditions. Also CO buildup happens predominantly in cold weather. Finally

the particulate matter levels can be affected by the amount of rainfall as well as wildfires.

Litigation

On May 14, 1999, the U.S. Court of Appeals for the District of Columbia Circuit issued an opinion (modified on October 29, 1999) that calls into question EPA's ability to adopt and enforce the new ozone and PM national ambient air quality standards (NAAQS) that were issued in July 1997. EPA strongly disagrees with this decision and, together with the Department of Justice, has filed a petition asking the Supreme Court to overturn the decision. The case did not affect the pre-existing NAAQS, which have not yet been met in a number of areas.

During this phase of the litigation, we believe we should not take actions implementing these new standards if the actions could be construed as inconsistent with the court's opinion. However, we continue to believe that the standards are necessary to protect public health, and nothing in the decision undercuts that belief. We are evaluating our programs to determine how best to secure necessary public health protections while still respecting the court's decision.

Objective #1: Attain NAAQS for Ozone and PM

By 2010, improve air quality for Americans living in areas that do not meet the National Ambient Air Quality Standard (NAAQS) for ozone and particulate matter (PM).

Resource Summary
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
Attain NAAQS for Ozone and PM	**$387,110.4**	**$382,105.9**	**$455,169.9**	**$73,064.0**
Environmental Programs & Management	$84,891.5	$103,123.9	$103,358.0	$234.1
Science & Technology	$146,263.3	$128,275.4	$132,001.9	$3,726.5
State and Tribal Assistance Grants	$155,955.6	$150,706.6	$219,810.0	$69,103.4
Total Workyears	$1,127.6	1,193.2	1,188.8	-4.4

Key Programs
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$155,955.6	$150,706.6	$160,510.0
Mobile Sources	$48,975.8	$45,496.0	$53,479.4
Childrens Health	$0.0	$1,000.0	$1,000.0
Tropospheric Ozone Research	$18,100.4	$6,273.7	$8,543.4
Particulate Matter Research	$55,842.9	$62,300.5	$65,267.9
EMPACT	$2,578.7	$2,969.1	$2,230.6
Project XL	$0.0	$390.5	$0.0
Common Sense Initiative	$0.0	$135.6	$237.2
Clean Air Partnership Fund	$0.0	$0.0	$59,300.0

Ozone	$30,979.3	$29,696.0	$32,092.2
Particular Matter	$26,807.0	$26,421.2	$33,226.4
Regional Haze	$12,271.7	$1,851.5	$2,233.0
Rent, Utilities and Security	$0.0	$21,005.2	$23,040.7
Administrative Services	$304.3	$3,058.3	$3,225.7
Regional Management	$0.0	$215.4	$214.2

FY 2001 Request

Under the Clean Air Act, EPA must set NAAQSs for pollutants that are widespread, endanger public health and the environment, and originate from numerous and diverse sources. For each pollutant, EPA sets both health-based or "primary" standards to protect human health, and welfare-based and "secondary" standards to protect the environment (crops, vegetation, wildlife, buildings and national monuments, etc.). States and tribes then must develop and carry out strategies and measures to attain the NAAQS. These strategies and measures are included in state implementation plans (SIPs) and tribal implementation plans (TIPs). The Clean Air Act also requires states to develop programs to protect and improve visibility in national parks and wilderness areas. EPA works in partnership with Federally recognized tribes to carry out Federal trust responsibilities and implement those provisions of the Act that most effectively address air quality management concerns on tribal lands. In addition, EPA establishes, implements, and enforces national control programs on such sources as motor vehicles and fuels.

In July 1997, EPA published revised, more protective NAAQSs for ozone and PM. On May 14, 1999, the United States Court of Appeals for the District of Columbia Circuit issued an opinion, modified on October 29, 1999, remanding the revisions on the grounds that Section 109 of the Clean Air Act – as applied in setting these new public health standards – were unconstitutional as an improper delegation of legislative authority to the executive branch. The Court held further that the classification scheme and attainment dates for the pre-existing primary 1-hour ozone standards in Subpart 2 of the Clean Air Act affect the Agency's ability to enforce the revised 8-hour ozone standard; that EPA must consider whether ozone has a beneficial effect in reducing exposure to UVb radiation, and if so, consider such effects in assessing ozone's net effects on health; and that PM_{10} was a poorly matched indicator for coarse particulate pollution because PM_{10}, as currently defined, includes fine particles (for which EPA has now set a separate standard). The Court did not question the science EPA relied on or the process EPA used in revising the NAAQSs.

EPA strongly disagrees with this decision. It is a significant departure from well-established case law and carries with it dangerous implications not only for the new public health air quality standards, but also for many other Federal laws or rules enacted to protect the health of the American people. For this reason, the Administration is seeking review by the Supreme Court of the decision on the constitutional issue and EPA's ability to enforce the 8-hour standard.

During this phase of the litigation, EPA plans to take no actions implementing the new standards if the actions could be construed as inconsistent with the court's opinion. However, the Agency continues to believe the new standards are necessary to protect public health and nothing in the decision undercuts the scientific basis for the standards. We are evaluating, and will continue to

evaluate, clean air programs to determine how best to secure necessary public health protections while still respecting the court's decision.

The May 1999 Court decision does not affect the pre-existing NAAQSs, which have not yet been met in a number of areas. In light of the litigation, the Agency's 2000 efforts will be devoted to maximizing the public health protection available under the 1-hour ozone standard and the pre-1997 PM_{10} standard. To protect against backsliding during the litigation, EPA has proposed reinstating the 1-hour ozone standard in those areas where it was revoked when the 8-hour standard was established.

In 2001, EPA will provide research, technical tools, guidance, and data: (1) to support EPA's decisions on the need to revise or reaffirm the NAAQS for PM in 2002 and later years; and (2) to support state, tribal, and local analyses of their ozone and PM problems and the need for additional air pollution controls. EPA also will establish Federal standards and measures for key stationary and mobile sources that contribute to unhealthy levels of ozone and PM and that are best regulated at the national level. The budget request is geared toward enhancing scientific knowledge and filling critical information gaps regarding particulate matter before states, tribes, and local governments identify areas not meeting the health-based NAAQS and begin to develop programs to reduce health risks. The EPA-sponsored research on PM included in this proposal follows the recommendations from the National Academy of Sciences (NAS).

Urban and regional-scale numerical grid models (i.e., UAM-IV, UAM-V, CAMx, etc) continue to be used extensively for analysis of ozone issues and preparation of State Implementation Plans (SIPs) during 2000 and are expected to continue into 2001 and beyond. In addition, the use of other modeling systems (i.e., REMSAD and Models-3) will intensify in support of Regional Planning Bodies (RPBs) for addressing regional haze and for PM 2.5. The applicability of such models will also benefit such programs as the Great Lakes Initiative, U.S./Mexico Border, and the air toxics program. EPA, states and RPBs will work collaboratively in developing the capability to continue using these models, evaluating their accuracy and applicability to complex air quality issues, testing and analyzing emission control alternatives, as well as sharing information on model input data and estimates of ambient concentrations. Models-3 is expected to be the focus of significant efforts for evaluation, testing and application to multi-pollutant programs.

EPA will focus extensively on public outreach and access to high quality information for general and technical audiences to facilitate public understanding and smooth implementation of the new NAAQSs. Improved information quality and access will enable citizens and users to obtain "real-time" air quality information, and enable EPA to better track environmental indicators and assess progress.

Ozone. Unlike most other pollutants, ozone is not emitted directly into the air by specific sources, but is created by sunlight acting on nitrogen oxides (NO_x) and volatile organic compounds (VOCs). Some common sources include: gasoline vapors, chemical solvents, combustion products of fuels, and consumer products.

Ozone can impair the normal functioning of the lungs for people with respiratory problems as well for healthy people. Relatively low amounts of ozone can cause chest pain, shortness of breath, and coughing. Ozone also may worsen asthma, bronchitis, and emphysema and is associated with increased hospital admissions in many cities. Repeated exposure to ozone over months to years can damage lung tissue and reduce quality of life. Repeated exposure to high levels of ozone for several months can also produce permanent structural damage in the lungs. Adverse ecosystem effects are known to occur for various species of vegetation and are likely to extend to entire

ecosystems. Ozone damage to plants is extensive, with major impacts on commercial crops of wheat, corn, soybeans, cotton and commercial forestry.

More people are exposed to unhealthful levels of ozone than to any other air pollutant. Meeting the new 8-hour ozone standard would protect 13 million more children from exposure to unhealthful levels of smog than the previous standard.

Emissions of ozone precursors can be carried hundreds of miles from their origins, and result in high ozone concentrations over very large areas of the country affecting a given state's ability to attain the NAAQS through traditional SIP programs. To address this persistent and widespread problem, EPA will continue to work with affected states, local governments, tribes and other stakeholders, developing control strategies for NOx and other precursors using a regional approach rather than a state-by-state approach.

EPA will administer the national program to implement the 1-hour NAAQS for ozone, providing oversight and coordinating among Regions and with states to provide national consistency and developing policy and guidance to resolve major issues. EPA and states will continue outreach efforts to promote public awareness of the Air Quality Index (including 8-hour levels) and the effects of ozone on health. Working closely with states and industry, EPA will develop a program of SIP credits that result from voluntary measures to reduce emissions. States will continue to implement the 1-hour ozone standards. For severe areas, states must develop and submit the necessary local control measure portions of the required 1-hour ozone attainment demonstrations with supplements to address approvability issues such as transportation conformity budgets and emission reduction "shortfalls."

EPA will issue final guidance in 2000 on an economic incentives program to encourage states to reduce emissions of air pollutants in the most efficient manner. EPA will continue to provide guidance on market-based approaches to emissions control and to review and approve emissions trading protocols for nationally significant source categories facilitate these trading programs.

In 2001, EPA will review, and as appropriate revise, the policy used for responding to petitions from industry for exemption of a compound from controls as a VOC. The Agency will continue to work with tribes: developing programs for Indian Country, making eligibility determinations, completing VOC and NOx emission inventories and approving tribal air programs as appropriate.

In addition, the agency is undertaking a number of actions to assess air quality in Indian country and to work with tribes to identify appropriate measures to address problems. The agency will work with tribes to develop emission inventories of sources on reservation lands and to establish monitoring networks in Indian country to begin assessing the levels of ambient air pollution.

To better assess the causes of the ozone problem, EPA will continue to collect ambient air measurements for a target list of VOCs (precursors to both ozone and PM), as well as for nitrogen, ozone, and both surface and upper air meteorological measurements from the photochemical assessment monitoring station (PAMS) network. In 1999, there are 24 PAMS areas, three of which are new areas. In 2001, the three new areas will still be adding sites to their PAMS network and the more established areas will have sites with up to eight years of data. Continued national and local analyses of the PAMS data will provide: 1) insight into how ozone precursors and toxic pollutants contribute to the ozone problem; 2) a trends assessment of ozone, ozone precursors, and toxic pollutants; 3) an evaluation of pollutant management programs; and, 4) a data base for developing control strategies. EPA also will explore and implement improvements to emissions testing and

monitoring approaches for VOCs, including better and less expensive continuous monitors and more reliable techniques for analysis of water-based coatings, inks, and other solvents. EPA is also working to improve emissions testing and monitoring of the low level NOx emissions required in SIP's.

To address the need for further reductions in motor vehicle emissions to attain and maintain the new NAAQS, the Agency will review current motor vehicle and fuel standards and develop new programs. In 1996, light-duty vehicles (LDVs) and light-duty trucks (LDTs) contributed more than 22 percent of national NO_x emissions and 25 percent of VOC emissions. In 2000, the Agency promulgated the Tier 2 program to begin in 2004. These standards, which will for the first time be identical for both cars and light trucks, will also include measures to enhance flexibility and cost effectiveness. In 2001, the Agency will continue work to implement Tier 2 vehicle and new Phase 1 heavy-duty highway diesel engine and vehicle, NOx and PM emissions standards and gasoline and promulgate diesel sulfur requirements. This includes continued assessment of required technology. In addition, EPA plans to finalize Phase 2 standards for heavy-duty highway diesel engines and vehicles, including new diesel fuel sulfur requirements. Additionally, in 2001, the Agency, as part of the implementation of the existing Tier 1 and National Low Emission Vehicle (NLEV) programs, will continue to ensure that projected emission benefits from these programs are achieved.

New Standards will result in 77% NOx Reduction for Cars

Year	1975	1977	1981	1994	1999	2004+
NOx Standard (gpm)	3.1	2.0	1.0	0.6	0.3	0.07
NOx Reduced (from previous standard)		35%	50%	40%	50%	77%

New Standards will result in 86% NOx Reduction for Light Trucks (LDT-2)

Year	1975	1977	1981	1994	1999	2004+
NOx Standard (gpm)	3.1	2.3	1.2	0.6	0.5	0.07
NOx Reduced (from previous standard)		26%	48%	50%	17%	86%

In 2001, EPA plans to finish the last of four rulemakings to address emissions from the whole range of marine engines. The upcoming effort will reduce emissions from recreational diesel marine engines and gasoline sterndrive and inboard engines. We already have set standards for other marine engines, including outboard and personal watercraft and commercial marine diesel engines.

Outboard and personal watercraft engines account for about eight percent of the mobile source VOC inventory. The phase-in of the standards started in 1998 and will be fully implemented in 2006; we project a 75 percent reduction in VOC emissions in 2025. EPA will consider a new tier of standards after full implementation of the current standards.

Commercial marine diesel engines account for about 4.5 percent of the mobile source NOx inventory; their extensive use around harbors causes a greater concentration of emissions around port cities. The implementation dates for these engines range from 1999 or 2000 for engines rated under 37kW to 2004 or 2007 for larger engines. We project a 24 percent reduction in NOx and a 12 percent reduction in PM from these engines in 2020. EPA proposed an additional tier of standards but did not finalize them. Additional standards will be considered in the coming years.

EPA will continue implementing the emission standards for locomotives that will result in more than 60 percent reduction in NO_x, beginning in the year 2000. Standards will help states comply with NAAQS for ozone and PM. There are three separate sets of locomotive emission standards, with applicability of the standards dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) apply to locomotives and locomotive engines originally manufactured from 1973 through 2001, any time they are remanufactured in calendar year 2000 or later. The second and third sets of standards (Tier 1 and Tier 2) apply to locomotives and locomotive engines originally manufactured on or after January 1, 2002 (Tier 2 standards will take effect on January 1, 2005). In 2001, the Agency will continue to evaluate certification test data to insure locomotive designs comply with standards. In addition, the Agency will begin collecting Production Line Test data that helps ensure that new locomotive manufacturers develop an optional in-use emission factor program that can be used for 2002 - 2004 model year locomotives in place of the required in-use testing program contained in the regulations.

In 2001, EPA will partner with states, tribes, and local governments to create a comprehensive compliance program to ensure that vehicle and engines are clean. EPA will use advanced in-use measurement techniques and other sources of in-use data to monitor the performance of on-board diagnostic (OBD) systems on vehicle models to make sure that OBD is a reliable check on the emissions system with vehicle inspection and maintenance (I/M) programs and to ensure the overall emission system durability on such vehicles. With this information, we will work to establish an integrated information system which allows for assessment and action on those vehicles and engines categories which present the greatest environmental risk.

EPA will provide key support for the technical development and application of OBD systems for vehicles and engines; OBD systems serve as the critical mechanism for identifying and repairing emission-related problems. In support of states, tribes, and local governments, EPA will provide technical assistance regarding the use of OBD systems as part of a comprehensive inspection and maintenance program.

The Agency will continue to ensure implementation of I/M programs and to review SIPs. In 2001, about 37 states will be implementing I/M programs. EPA will continue providing technical and programmatic guidance to states and local agencies for implementing high technology-based I/M programs. The Agency will develop OBD SIP credits and will finalize implementation guidance for I/M test methods and for I/M clean screening. In 2001, following a 2000 rulemaking proposal, EPA will implement the OBD inspection in I/M lanes to evaluate the adequacy of the OBD technology in identifying high emitting vehicles, vehicle owner responsiveness to OBD malfunction indicator lights, and adequacy of the technology in replacing tailpipe testing for OBD-equipped vehicles throughout their useful life. The Agency will continue to apply its in-use program.

EPA will assist in the evaluation of the National Highway System Designation Act programs, facilitating actions across regions to ensure national consistency on the adequacy of demonstrations. As part of implementing the ozone standard and regional haze rule, EPA's Transportation Air Quality Center will continue assistance to states and local governments including implementation of the transportation conformity rule and support for voluntary mobile source programs. EPA will continue to develop partnerships that emphasize the development of innovative transportation control strategies and voluntary mobile source programs. The Agency will continue providing technical guidance for implementing the National Low Emission Vehicle program. The Agency will promulgate regulations dealing with transportation conformity in 2000 which will be implemented in 2001.

The Agency will continue implementing Phase II of the reformulated gasoline (RFG) program, which will result in additional VOC, NO_x, and toxic emission reductions in 17 states and the District of Columbia, and will provide technical and programmatic guidance to states implementing clean fuel programs. RFG is designed to reduce vehicle emissions of ozone-forming and toxic pollutants and it is required to reduce VOC emissions by 25 percent, toxic emissions by 22 percent, and NO_x emissions by 6.8 percent. EPA will continue to address issues associated with the use of oxygenates (e.g., MTBE and ethanol) in RFG, with emphasis on implementing September 1999 recommendations from the Blue Ribbon Panel on the Use of Oxygenates in Gasoline. EPA will process approximately 100,000 fuel quality reports and review 156 fuel surveys with 17,000 samples.

The National Vehicle and Fuels Emissions Laboratory (NVFEL) will continue to conduct pre-production tests, certification audits, in-use assessments, and recall programs to support mobile source programs. In 2001, EPA will continue conducting testing activities for fuel economy, LDV and heavy-duty engine (HDE) characterization, Tier 2 testing, reformulated gasoline, future fleets, OBD evaluations, certification audits and recall programs. To support confirmatory and compliance programs, the NVFEL will conduct 400 certification and fuel economy tests on LDV, LDT and Medium Duty Passenger Vehicles (MDPV) families and will conduct 200 compliance on in-use LDVs and LDTs. In addition, EPA will conduct 200 tests on LDVs, LDTs, and MDPVs and 250 tests on on-highway HDEs, non-road compression-ignition engines, and spark ignition engines. EPA also will conduct 250 tests on LDVs, LDTs, and MDPVs and 300 tests on on-highway HDDEs, non-road compression-ignition engines, and on-road spark-ignition engines. The Agency will continue providing guidance and training in the use of the MOBILE6 model.

The certification program will oversee more than 100 original equipment manufacturers and issue certificates of compliance with the latest emission standards. The mobile source fees program will collect approximately $9.7 million, offsetting costs of the certification, recall, selective enforcement audit, and fuel economy programs. The statutory fuel economy information program will issue 1,000 economy consumer labels and data for the Gas Mileage Guide and "gas guzzler" tax collection. This program will issue approximately 250 certificates for LDVs, 250 certificates for LDTs, 125 certificates for motorcycles, 150 certificates of on-highway gasoline and diesel engines, 500 certificates for CI non-road engines, 550 certificates for small SI engines, 175 certificates for marine engines required to meet EPA standards, 50 certificates for marine engines required to meet International Maritime Organization (IMO) emission standards, 15 certificates for locomotive engines, 1,000 test audits for manufacturer compliance and 300 confirmatory tests.

The 2001 model year will be the first year of mandatory participation in the Agency's new compliance assurance program (CAP 2000). CAP 2000 will simplify and streamline the current procedures for pre-production certification of new motor vehicles. Manufacturers are projected to save $55 million each year under the CAP 2000 program. Under CAP 2000, manufacturers will supply in-use test data for each class of vehicle sold. These data will be an important tool for the Agency in targeting its recall testing investigations.

In addition to its Title IV responsibilities, the Acid Rain Program operates the NOx Allowance and Emissions Tracking Systems for the NOx Budget Program, as requested by the 12 States of the Ozone Transport Region (OTR). Compliance for this program is being phased in over the 1999 to 2001 summer ozone seasons due to litigation complications. Over 900 facilities will require certification of emissions monitors for reporting quarterly emissions data to EPA. The OTR Program is expected to increase EPA's current allowance trading activities by approximately 50 percent. Coupled with reductions achieved through Title IV implementation, it is anticipated that the NOx Budget Program will result in approximately a 50 percent reduction of NOx emissions in the OTR from the 1990 baseline, which will be maintained annually through at least 2002. In 2001, the second

phase of this program will be completed and work on Phase III will be initiated, with expected implementation by 2003.

In 2001 and 2002, the Acid Rain Program will also be involved in implementing the NOx reduction programs under the NOx SIP Call or Section 126 Petitions, depending on the outcome of current litigation. (The D.C. Circuit has temporarily stayed the NOx SIP submission date pending its decision on the merits). The SIP Call could comprise an additional 1,400 units requiring review of monitoring plans, certification of monitoring methods, and reporting of quarterly emissions. Furthermore, the Acid Rain Program may be involved in administering the Emission and Allowance Tracking Systems for a NOx reduction program that involves trading across 22 States.

Particulate matter. PM is the term for solid or liquid particles found in the air. Some particles are large enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Because particles originate from a variety of mobile and stationary sources (diesel trucks, woodstoves, power plants, etc.), their chemical and physical compositions vary widely. PM can be directly emitted or can be formed in the atmosphere when gaseous pollutants, such as sulfur dioxide (SO_2), VOCs and NO_x, react to form fine particles.

During 2000, EPA is preparing a comprehensive summary of the recent scientific findings regarding air quality, exposure, and health effects of PM in the PM Criteria Document, and this document will be completed and available to the public in the fall of 2000. On the basis of the findings reported in the Criteria Document and other analyses, such as air quality trends and risk assessment analyses, EPA will prepare a Staff Paper that provides recommendations to the Administrator on how the PM NAAQS should be revised. The Staff Paper development is being initiated in 2000 and the first draft will be reviewed by the CASAC in the fall of 2000. During 2001, the Staff Paper will be revised for a second review by the CASAC, and the completed document will be available in spring of 2001. As the Staff Paper is completed, development of a proposal for how to revise the PM NAAQS will begin. The proposed rule is targeted for publication in fall 2001.

EPA is better defining the $PM_{2.5}$ (or PM fine) problem by assisting states and tribes in establishing and maintaining a nationwide monitoring network and carrying out source characterization analyses. Since promulgating the new $PM_{2.5}$ standards, EPA has been working with states and tribes to install monitors and obtain data on $PM_{2.5}$ particle emissions including 28 monitors for Indian Country. This compliance network is fully operational for states as of December 31, 1999. The Indian Country monitors should be operational by December 31, 2000. EPA has committed to providing 100 percent of the funding through state and tribal grants under the authority of section 103 of the Clean Air Act. EPA also will promote the use of continuous PM monitoring and improved fine PM test methods. States and tribes will also use the air quality data and chemical speciation data to identify PM sources and "hot spots" for purposes of developing any SIPs and TIPs that may ultimately be required depending on the resolution of the NAAQS litigation. As recommended by NAS, EPA is discussing with the Clean Air Science Advisory Committee ways to increase the usefulness of the resultant monitoring data to PM health effects and epidemiology researchers.

EPA, states, and tribes will continue to implement the CAA requirements for the pre-1997 PM10 standard, including bump-ups and SIP rulemaking actions on plans for serious PM10 nonattainment areas. Monitoring data for PM_{10} will continue to be used to characterize emission sources, evaluate air quality models, and contribute to the regular scientific health review of the standard.

To ensure the source and ambient monitoring measurements are credible, EPA will continue to develop and conduct quality assurance protocols. Currently our efforts are focused on the quality assurance of the ambient PM2.5 monitoring network because of its recent establishment.

In 2001 and beyond, EPA will also develop improvements to source testing and monitoring methods for PM and PM2.5 emissions from stationary sources. These method improvements are needed at this time for characterization of PM2.5 emissions. The improved methods will also be available for determining compliance with any future PM2.5 SIP emission limits that may be needed.

EPA will continue to assist states, local governments, and tribes in maintaining existing control programs and in devising stationary source and mobile source strategies to reduce PM. EPA will provide guidance on SIP requirements, the impact of fire and agricultural processes on PM levels, and benefits to PM implementation of regulations designed for controlling toxics. EPA will further provide guidance that integrates any future implementation of PM standards with implementation of the new regional haze rule.

Levels of PM caused by mobile sources are expected to rise in the future due to the projected increases in the number of individual mobile sources and in motor vehicle travel. The Agency will continue to seek further reductions in motor vehicle emissions to attain and maintain the NAAQSs through the review of current motor vehicle and fuel standards and the development of new programs. EPA will promulgate new diesel fuel standards and Phase 2 heavy-duty vehicle and engine standards. The Agency will continue working toward implementing Phase 1 heavy-duty standards for the 2004 model year and the Tier 2 standards. The 2001 non-road engine technology review will be finalized. The Agency will continue work on PART6 (Particulate emission factor model) for PM inventories and analyses. EPA will conduct studies on in-use performance of advanced technology vehicles.

EPA will develop a series of guidance documents for the particulate matter program to provide infrastructure for implementing the new standards. EPA will continue public outreach activities, especially to create materials for the general public on fine particulate matter.

Visibility. Visibility impairment, caused by the presence of tiny particles in the air, is most simply described as the haze that obscures the clarity, color, texture, and form of what we see. The Clean Air Act gives special protection to natural areas that we want to preserve for future generations, such as our national parks and wilderness areas.

EPA promulgated a final regional haze rule in 1999. Because of regional variations in natural conditions which combine with man-made pollution to produce regional haze, EPA believes that regional haze should be addressed through a region-specific program that accounts for these variations. EPA worked with states to establish five regional planning bodies. Through dedicated funding included in this request, EPA will be working closely with the regional planning bodies to develop the technical basis for future policy decisions and tailor programs that take into account the varying conditions in the different geographical areas.

Since 1987, EPA has supported the long-term visibility monitoring program known as the Interagency Monitoring of Protected Visual Environments (IMPROVE) network. The IMPROVE network collects data on visibility, including optical and photographic data, at 30 sites. To broaden understanding of class I area visibility, EPA will add an additional 78 sites to the IMPROVE network in early 2000. EPA will work with western states to determine the steps that are needed to preserve clear days and improve visibility in the 16 national parks and wilderness areas located in the Colorado

Plateau. An Eastern regional haze program will address visibility impairment in the Appalachian Mountains. IMPROVE sites will also better characterize background $PM_{2.5}$ levels.

Regional emissions reductions to attain any fine particle NAAQS that may become effective in the future and meet requirements of other programs (such as the acid rain program) would be expected to improve visibility in certain parks and wilderness areas, particularly in the East. In parts of the West, visibility is expected to improve as western states implement the recommendations of the Grand Canyon Visibility Transport Commission.

Implementation of NAAQS and Visibility Requirements

Ground-level ozone, fine PM, and regional haze have many similarities. Both ozone and PM (and the resulting regional haze) remain in the atmosphere for days, leading to regional scale transport that can affect broad areas of the country. Both pollutants are formed under certain atmospheric conditions by gases, such as NO_x and VOCs, emitted by the same types of sources. Moreover, there are similar health effects associated with exposure to ozone and PM (e.g., increased respiratory symptoms and increased hospital admissions and emergency room visits for respiratory causes). The similarities between the pollutants and the regional haze problem provide opportunities for integrated strategies for reducing pollutant emissions in the most cost-effective ways.

EPA also recognizes the increased burden on state and local agencies in controlling multiple pollutants. To address this EPA is developing technologies to help states form control strategies to address the multiple pollutants with NAAQS. One of the activities EPA is currently engaged in is developing an integrated ambient monitoring strategy to determine the optimal number of monitors and associated man-hours needed for each pollutant given the competing needs of measuring the other pollutants. As we determine the need to add monitors or change location of monitors in the network, we will use this strategy to minimize any increase in resources needed.

The strategy for implementing any new ozone and particulate matter standard together with regional haze requirements will be targeted at maintaining air quality protection efforts currently underway and building on the agreements and progress already made by communities and businesses. In carrying out the implementation strategy, EPA will seek to reward state, tribal, and local governments and businesses that take early action to reduce air pollution levels through cost-effective approaches and address pollution that travels across jurisdictional lines. EPA will work with states and tribes to develop control programs that employ regulatory flexibility to minimize economic impacts on businesses to the greatest possible degree consistent with public health protection. EPA also will attempt to minimize regulatory burdens for states, tribes, local governments, and businesses and ensure that air quality planning and related Federal, tribal, state and local planning are coordinated.

Research

Tropospheric Ozone Research

EPA's tropospheric ozone research program is devoted to the two missions of: 1) periodic review and revision as needed of the NAAQS, (i.e. risk assessment and effects research); and 2) implementation and attainment of the NAAQS, (i.e. exposure and risk management research). In FY 2001, the Agency will continue its ozone research in risk assessment, exposure and risk management. Ozone specific health effects research is not planned for FY 2001, however evaluation of ozone effects as a co-pollutant will continue under the PM research program. Ozone ecological

effects research is also nota addressed here for FY 2001, but addressed instead under Ecosystem Protection research.

Research will continue on the development of improved risk assessment procedures and preparation of the next round of Criteria Documents for ozone. Criteria document development for other NAAQS (e.g., carbon monoxide, nitrogen dioxide, lead and sulfur dioxide) currently falls under the ozone program. In FY 2001, the Agency will develop tropospheric ozone, nitrogen dioxide and/or sulfur dioxide Air Quality Criteria Documents through planning, development, and/or consultation. These Criteria Documents are the scientific foundation for NAAQS decisions.

In order to help states achieve the Ozone NAAQS under their State Implementation Plans (SIPs), EPA will continue its exposure and risk management research on atmospheric chemistry and emissions based air quality models, observation based methods and modeling, and source emissions. Products derived will provide the means for comprehensive State planning and later evaluation of the relative effectiveness of the major emissions reduction strategies for volatile organic compounds (VOCs) and nitrogen oxides (NO) to reduce ozone. Products will be particularly useful in the development of the attainment demonstration SIPs due to be submitted by States to EPA. EPA will continue to explore innovative analytic approaches like combining observational approaches with emissions-based modeling, to help cope with even more difficult attainment problems, such as regional NOx control strategies.

Exposure research on atmospheric chemistry and modeling continues to focus on identifying the causative agents responsible for non-attainment, e.g. chemical constituents, sources and source regions, and meteorological variables. This research will also describe missing features of the atmospheric chemistry of ozone formation and produce a new streamlined module (the Morphecule mechanism) of ozone forming chemistry for use in atmospheric chemistry models, greatly reducing their computational requirements and increasing their capabilities. In addition, the next generation regional air quality model (Models-3/CMAQ, or Community Model for Air Quality) will be thoroughly evaluated and its reliability in projecting impacts of alternative control strategies characterized.

Exposure research on methods and observations-based assessments in FY 2001 will provide a reliable means of determining with certainty the result of State and local emissions reductions by developing ambient techniques to measure ozone precursors and their transformation during meteorological transport. EPA will develop and evaluate these observational based methods, through intensive regional field studies, to compliment emissions based, physical theory modeling, and develop the protocols, combining modeling and observational approaches, for use by the scientific and policy community in conducting integrated multi-scale program effectiveness assessments.

Risk management research will focus on biogenic and mobile emissions in order to improve the accuracy of emission estimates from these sources. Biogenic emission research will develop improved emission factors for additional vegetative types and compounds, understand how human activities (mowing and harvesting) influence emissions, determine how emissions change between seasons, regional differences in biogenics and perform model validation studies. Mobile emissions research will focus on further development and validation of the Mobile Emissions Assessment System for Urban and Regional Evaluation (MEASURE) which provides more accurate modal-based emission estimates. Studies will be performed to add information on vehicles characterized as “high emitters”and to collect actual on-road data using an instrumented car to validate MEASURE outputs. The data generated from this research is used by EPA to develop National Emissions Trends

Databases and by state and local planners as inputs to the atmospheric chemistry models (Models-3/CMAQ) used to evaluate attainment strategies.

Particulate Matter Research

The particulate matter (PM) research program provides the scientific basis for periodic review and revision as needed for the PM NAAQS (i.e. effects, human exposure and risk assessment research), and the implementation and attainment of the PM NAAQS (i.e. environmental exposure and risk management research).

EPA's 1998 appropriation bill identified an important role for the National Academy of Sciences (NAS) in developing and monitoring implementation of a comprehensive, prioritized, near- and long-term particulate matter research plan. The NAS issued its initial report, *Research Priorities for Airborne Particulate Matter, Immediate Priorities and a Long-Range Research Portfolio*, in March 1998. EPA has continued to work with the NAS panel, and an updated report on research priorities, *Research Priorities for Airborne Particulate Matter: Evaluating Research Progress and Updating the Portfolio*, was issued in August 1999. This Annual Performance Plan (APP) is consistent with the update and reflects the refocusing of Research Topics 3 and 4 of the NAS Plan, which now encompass research previously identified as "Implementation Research" in prior APPs. NAS' ten priority areas for PM research are:

1. Outdoor measures versus actual human exposures to PM;
2. Exposure of susceptible subpopulations to toxic PM components;
1. Characterization of PM emission sources;
2. Air quality model development and testing;
3. Assess hazardous PM components;
4. Dosimetry;
5. Effects of PM and co-pollutants;
6. Identify susceptible subpopulations;
7. Toxicological mechanisms of injury; and
8. Analysis and measurement.

Health Effects and Human Exposure Research

Under NAS research topics 1 and 2 ("Outdoor measures vs. Actual human exposures" and "Exposure of susceptible subpopulations"), research will develop information on major classes of potentially toxic components found in daily exposure levels for use by health effects researchers in creating hypotheses and analyzing mechanism studies described below. Exposure research planned for 2001 also includes analysis and reporting of exposure data for the general population and susceptible sub-populations, and using this data to test a first generation exposure model for extrapolating exposures to unmonitored areas. Work will continue on linking the exposure model to atmospheric models and lung deposition models.

Health effects research will work to fill the current gaps in our understanding of the observed excess mortality and morbidity associated with particulate air pollution. Epidemiologic and toxicological studies will help answer questions regarding the biological mechanisms underlying PM-related effects, and will also help identify which PM components are associated with health effects.

Under NAS areas 5,6 and 9 ("Assess hazardous PM components," "Dosimetry" and "Mechanisms of injury") EPA will determine physical, chemical, and biological characteristics of

particles responsible for adverse health effects and dose-response relationships between PM constituents and adverse health effects.

Health effects research planned for FY 2001 involving *in vivo* and *in vitro* studies of interactions between PM and other air pollutants falls under NAS topic 7 ("Combined effects of PM and co-pollutants"), as do planned toxicology and clinical studies to investigate effects of co-pollutants on PM health effects, deposition, and clearance. Under NAS topic 8 ("Susceptible subpopulations") EPA effects research efforts will identify subpopulations with enhanced sensitivity to the adverse effects of PM and determine how host susceptibility factors influence dose-response relationships. Under this same NAS topic, health effects research will also conduct epidemiology/exposure studies aimed at identifying morbidity effects on vulnerable population subgroups.

Environmental Exposure and Modeling

Under revised NAS topic 4("Air-Quality-Model Development and Testing,") the Agency plans in FY 2001 to conduct atmospheric measurement and modeling research to evaluate the chemical and physical processes that control the organic and inorganic chemical composition of PM. The Agency also plans to begin developing urban-to-regional scale emissions based air quality models and source apportionment models and their component inputs (e.g., chemical mechanisms and source speciation profiles). This effort will serve to increase understanding of atmospheric processes (including meteorology) and chemistry that affect the secondary formation, transport and fate to support NAAQS implementation planning. In FY 2001 the Agency will: begin developing and evaluating better PM monitoring instruments and methods needed to accurately determine the physical properties, chemistry and composition of atmospheric aerosols; and use data from the application of these and other advanced methods to test and evaluate improved source-to-receptor models for observationally determining the sources contributing to a region's PM levels.

Risk Management Research

Risk management research under revised NAS topic 3 ("Characterization of Emissions Sources,") will study the mechanisms that influence the entry of fine particles into the indoor environment and to determine the emission characteristics of PM from priority indoor sources including vacuuming and combustion. Source emissions research will improve data on the emission rates and characteristics (size distribution, species) of the particles emitted. The influence of human activities on emissions will also be considered.

Also under revised NAS topic 3, EPA will provide updated and augmented data on the chemical composition of fine PM from a variety of mobile and stationary sources. EPA will also conduct PM emission characterization research to develop new or improved emission factors for sources of primary fine particles and for ammonia from animal husbandry operations, one of the major gaseous precursors of secondary fine particles, and to provide data on the size distribution of the particles emitted. In addition, laboratory and field studies will be conducted to determine the performance of advanced fine PM control technologies including improved fabric filters and electrostatic precipitators. Integrated systems which simultaneously reduce both primary and secondary gaseous precursors (nitrogen oxides, sulfur oxides) will also be investigated.

Analysis and Measurement

Under NAS research topic 10, EPA will support development and evaluation of advanced statistical methods for application to epidemiological data sets. Research will also be conducted to evaluate features and impact of mis-classification error on risk estimates.

PM Centers/Longer-term Research

The five university-based research centers, established in 1999, will continue to advance the scientific understanding of the health effects of PM through integrated studies that support a multi-disciplinary array of projects. The Agency's longer term research will focus on exposure, toxicology, and epidemiology.

Speciation/Supersites

Continued coordination and oversight of supersite monitoring activities will provide detailed air quality information to support atmospheric chemistry and modeling efforts, as well as mechanistic toxicology and epidemiology studies that will support both future NAAQS decision-making and implementation of the NAAQS.

FY 2001 Change from FY 2000 Enacted

EPM

- (-$10,045,800) Funding to support the following six Congressional earmarks in 2000 will not be continued in 2001: Southwest Center for Environmental Research and Policy (SCERP); Southern Appalachian Mountain Institute; National Alternative Fuels Vehicle Training Program; National Center for Vehicle Emissions Control and Safety; Northeast States for Coordinated Air Use Management (NESCAUM); and section 103 grants to states to help them develop regional haze programs. Funding for the section 103 grants in 2001 is requested in the STAG appropriation to continue helping the states and regional planning bodies with the regional haze program.

- (+$3,400,000) EPA will increase funding for developing emission factors from sources that states, tribes, and local agencies will need to develop and implement control strategies and for sources to write permits under the revised NAAQS.

S&T

- (-$2,849,900) Funding to support the following three Congressional earmarks in 2000 will not be continued: California Regional PM 10 and 2.5 Air Quality Study; University of California/Riverside CE-CERT Program; and the National Research Council study of the Clean Air Program.

- (-$1,300,000) Resources which provided support for PM site monitoring will be reduced as the sites are established and operating.

- (+$1,400,000) Resources will also be devoted to work on implementing the Tier 2 rule, which will result in major NOx reductions in the post-2004 time frame that are critical to the attainment and maintenance of the ozone NAAQS. Implementation this year will require

putting into place the geographic phase-in program, including identifying the counties for each area, reviewing and approving refinery sulfur baselines, and reviewing and approving applications for small refinery qualification. Increased resources will also provide support to the NVFEL lab to fund facility requirements that are needed to maintain the program. Emission measurement equipment must be upgraded to enable accurate measurement of the emission levels of vehicles and engines complying with the new NLEV and Tier 2 standards. Without these resources, the physical basis for the mobile source program's regulatory and compliance activities will no longer be able to sustain the required levels of regulatory, testing, and technology assessment activity.

STAG

- (+$5,000,000) Regional Planning Bodies for Regional Haze. In the 1999 and 2000 Appropriations, Congress earmarked funds for planning bodies to help states implement the regional haze rule. Five such planning bodies were established. States will also have to review their programs to coordinate progress toward regional haze reductions with ongoing programs.

- (+$59,300,000) Clean Air Partnership Fund. The Fund will provide an opportunity for cities, states, and tribes to partner with the private sector, Federal government and each other to provide healthy clean air to local citizens. The fund will demonstrate smart multi-pollutant strategies that reduce greenhouse gases, air toxics, soot, and smog to protect our climate and our health.

  The Clean Air Partnership Fund will: be a catalyst for innovative local, state, private partnerships for air pollution reductions; demonstrate locally managed, self-supporting programs that achieve early integrated reductions in soot, smog, air toxics, and greenhouse gases; be used to capitalize local revolving funds and other financial mechanisms that leverage the original federal investment and result in greater resources for air pollution reduction; and, stimulate technology innovation.

  The Clean Air Partnership will fund more optimal, multi-pollutant control strategies. Currently, businesses and municipalities often invest in short-term, single-pollutant control approaches. The Partnership will encourage many industries, such as electric utilities and the transportation sector, to pursue comprehensive criteria pollutant reductions while improving energy and operation efficiencies, thereby also reducing greenhouse gas emissions. The Clean Air Fund will provide these needed resources through mechanisms that promise significant leveraging of non-Federal resources. It is expected that the Fund will support the development of local revolving funds which will provide low-interest loans, matching funds, public-private partnerships, and other capitalization mechanisms.

Research

S&T

Ozone

- (+$960,420, +7.1 workyears) The request includes an increase in resources to support implementation and review of the NAAQS for ozone. The increase will support research to determine the causative agents responsible for ozone non-attainment and to provide a reliable

means of determining with certainty what has in fact been the result of state and local emissions reductions. Biogenic emission research under this request will improve the accuracy of emission estimates of volatile organic compounds emitted from natural sources. The data generated from this research will be utilized by state and local planners as inputs to the atmospheric chemistry models (Models-3) used to evaluate attainment strategies.

- (+$1,309,280, +1.8 workyears) The R&D program, including infrastructure support costs, is spread across eight of the ten goals in the Agency's GPRA/budget structure. Based on a review of actual infrastructure utilization under each goal (i.e., utilization of workyears and associated PC&B, travel, operating expenses, and working capital fund), adjustments are being made across goals to more accurately reflect expectations for use in FY 2001. These adjustments are expected to have no significant impact on performance goals or expectations for any single goal, nor for the research program as a whole.

Particulate Matter

While overall there is a $2.8M increase in PM, there are some internal redirections in the program as reflected in the discussion below.

- (+$7,136,270, +13.3 workyears) These resources will support PM chronic epidemiology research to evaluate the role of chronic PM and copollutant exposure in producing morbidity and mortality and to assess the most prominent PM health risks. This is in response to the NAS recommendation for a substantial program of epidemiology research beginning in 2001 as an enduring focus of EPA's PM research portfolio (NAS research areas 7 and 8.) Current PM chronic epidemiology data are very limited, yet data in hand indicate that chronic health effects from PM exposures are substantial. This research will provide the data needed to reduce uncertainty in setting an effective PM standard.

- (+$4,414,620, +13.8 workyears) An increase in resources is necessary in order to augment research activities to characterize PM emission sources (NAS 3), assess hazardous PM components (NAS 5), investigate PM dosimetry (NAS 6), identify the toxicological mechanisms of injury present in PM (NAS 9) and develop techniques for PM analysis and measurement (NAS 10). This increase will also support atmospheric measurement and modeling research to evaluate the chemical and physical processes that control the organic and inorganic chemical composition of PM. This effort will serve to increase understanding of atmospheric processes (including meteorology) and chemistry that affect the secondary formation, transport and fate to support NAAQS implementation planning.

- (-$892,900) This reduction is to the PM environmental speciation research program (the "Supersites" program.). Since portions of the PM research program's epidemiology, exposure, and implementation research make use of information provided Supersites, $2,000,000 remains in FY 2001 to support a core Supersites program.

- (-$2,943,600, -21.0 workyears) In order to better align the PM program with the NAS recommendations for FY 2001, resources are being diverted from exposure research (NAS research areas 1 and 2) to support higher priority work, such as epidemiology. The exposure research that would have been conducted with these resources will be deferred until FY 2002 and includes longitudinal panel studies of human exposures by susceptible subpopulations to PM. There will be only limited consequences of delaying this research for one year.

- (-$3,056,500) The 2001 request is $3,056,500 below the 2000 Enacted budget level due to Congressional earmarks received during the appropriations process that are not part of the 2001 President's Request.

- (-$1,690,490, -7.5 workyears) The R&D program, including infrastructure support costs, is spread across eight of the ten goals in the Agency's GPRA/budget structure. Based on a review of actual infrastructure utilization under each goal (i.e., utilization of workyears and associated PC&B, travel, operating expenses, and working capital fund), adjustments are being made across goals to more accurately reflect expectations for use in FY 2001.

Annual Performance Goals and Performance Measures

Reduce Ozone and Ozone Precursors

In 2001 Maintain healthy air quality for 33.4 million people living in 43 areas attaining the ozone standard; increase by 1.9 million the number of people living in areas with healthy air quality that have attained the standard; and certify that 5 new areas have attained the 1-hour standard for ozone.

In 2000 Maintain healthy air quality for 33.4 million people living in 43 areas attaining the ozone standard.

In 1999 The Regions revoked the 1-hour standard in 10 areas. However, based upon the Circuit Court decision regarding the revised ozone standard, the Agency has proposed to reinstate the 1-hour standard.

In 1999 Healthy air quality maintained for 33.4 million people living in 43 areas attaining the ozone standard.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Publish Notice Revoking 1-Hour Standard	10			Areas
Consumer Product Rules	0			Rules
National Guidance on Ozone SIP	1 Draft			Issued
States submit designations of areas for attainment of the ozone standard	50			States
Total Number of People who Live in Areas Designated to Attainment of the Clean Air Standards for Ozone	33,363,000	33,363,000	35,293,000	People
Areas Designated to Attainment for the Ozone Standard	0	0	5	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the Ozone Standard	0	0	1,876,000	People
VOCs Reduced from Mobile Sources	1,409,000	1,562,000	1,659,000	Tons
NOx Reduced from Mobile Sources	898,000	1,059,000	1,189,000	Tons

Baseline: As a result of the Clean Air Act Amendments of 1990, 101 areas with a population of 140,015,000 were designated nonattainment for the 1-hour standard. Through 1999, 43 areas with a population of 33.4 million have been redesignated to attainment. 38 areas are in nonattainment and 20 areas have had the 1-hour standard revoked. The 1995 baseline

for VOCs reduced from mobile sources is 8,134,000 tons and 11,998,000 tons for NOx, both ozone precursors. Mobile source data are validated by using speciated test data from the mobile source emission factor program, along with peer-reviewed models which estimate national tons for the relevant year of interest.

Clean Air Partnership Fund

In 2001 EPA will develop the infrastructure to implement the Clean Air Partnership Fund, which will demonstrate smart multi-pollutant approaches that reduce greenhouse gases, air toxics, soot, and smog.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Request for Proposals Issued			11/30/2000	
State, Local, and Tribal Organizations Informed			100	Percent
CAPF Funding Awarded			25	Percent

Baseline: In 2001, the Clean Air Partnership Fund is to be established. Baseline data will be developed as grants are awarded.

Reduce Particulate Matter

In 2001 Maintain healthy air quality for 1.26 million people living in 13 areas attaining the PM standards, and increase by 60 thousand the number of people living in areas with healthy air quality that have attained the standard.

In 2000 Maintain healthy air quality for 1.2 million people living in 7 areas attaining the PM standards, and increase by 60 thousand the number of people living in areas with healthy air quality that have attained the standard.

In 1999 Healthy air quality maintained for 1.2 million people living in 7 areas attaining the PM standards.

In 1999 EPA deployed PM-2.5 ambient monitors including: mass, continuous, speciation, and visibility sites resulting in a total of 1110 monitoring sites.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
National Guidance on PM-2.5 SIP and Attainment Demonstration Requirements	1 Draft			Issued
Provide Draft Documents to CASAC for PM NAAQS Review		30-Sep-2000		
Cumulative total number of monitoring sites deployed	1110			Sites
Total Number of People who Live in Areas Designated in Attainment with Clean Air Standards for PM	1,200,000	1,260,000	1,320,000	People
Areas Designated to Attainment for the PM-10 Standard	0	6	6	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the PM Standard	0	60,000	60,000	People
PM-10 Reduced from Mobile Sources	18,000	20,000	22,000	Tons
PM-2.5 Reduced from Mobile Sources	13,500	15,000	16,500	Tons

Baseline: As a result of the Clean Air Act Amendments of 1990, 84 areas with a population of 31,114,000 were designated non-attainment for the PM-10 standard. Through 1999, 7 areas with a population of 1.2 million have been redesignated to attainment. The 1995 baseline for PM-10VOCs reduced from mobile sources is 878,000 tons and 659,000 for PM-2.5. Mobile source data are validated by using speciated test data from the mobile source emission factor program, along with peer-reviewed models which estimate national tons for the relevant year of interest. "

Research

Ozone Measurement Research

In 2001 Develop tropospheric ozone precursor measurements methods, emissions based air quality models, observation based modeling methods, and source emissions information to guide State Implementation Plan (SIP) development under the current NAAQS.

In 2000 Develop tropospheric ozone precursor measurement methods, emissions based air quality models, observations based modeling methods, and source emissions information to guide State Implementation Plan (SIP) development under the current ozone NAAQS

In 1999 Peer reviewed STAR research grants were awarded that focus on developing methodologies for assessing uncertainties in emission inventories and techniques for incorporating GOES satellite data to improve regional scale ozone modeling assessments.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Recommend method for measuring Nox (nitrogen oxides and their products)		09/30/2000		method
Complete development and begin evaluation of the "Morphecule" approach for including complex chemical reaction mechanisms in photochemical pollution models like Models-3/CMAQ to be used in SIP dev.		1		approach
Complete evaluation of Models-3/CMAQ against field data to demonstrate reliability in ozone NAAQS attainment planning		09/30/2000		model eval.
In 1999 report on quantifying the uncertainty in emissions, chemical parameters and meteorological conditions for trajectory model.				
Complete evaluation of the ""Morphecule"" approach; and complete a requirements analysis for implementation and testing of the Morphecule mechanism in Models-3/CMAQ.				09/30/01
Support development of future SIP inventories by upgrading the Biogenic Emissions Inventory System (BEIS) Model to include data on how activities impact emissions of oxygenated VOCs.				upgrade

Baseline: The management of tropospheric ozone involves extensive modeling of emissions and atmospheric processes to identify effective control strategies. Because ozone is formed from transformation of precursors (i.e., volatile organic compounds and nitrogen oxides) in the presence of sunlight, this modeling is exceptionally complex. The tremendous variety of sources which affect ozone formation (automobiles, trucks, vegetation and other natural sources, industrial and energy production facilities) are a key input to the models. Emissions estimates for some sources (i.e nitrogen oxides from utility boilers) are quite good; however, estimates for some sources, particularly stationary and mobile area and natural sources remain uncertain. Over the last five to seven years, ORD research has focused on improving estimates from light duty vehicles, diesel trucks and natural sources. New models

(BIES and MEASURE) have been produced and are now being used as inputs in the newest versions of the regional ozone models. While improvements have been made, additional research is needed to upgrade the models already developed (to add additional natural source species, improve data on vegetation distribution across U.S., add module on how road grade effects mobile source emissions) and to address other small area sources which have not been addressed. These gaps need to be addressed to improve the existing emissions data used in State Implementation Planning. Some of the most significant advances in air quality modeling have come in our understanding of the chemical transformation, chemical interactions, long-range transport, and multiple pollutant interactions. The complex models used to link ambient concentrations to sources require additional validation and continued development incorporating state of the science chemical and physical processes data to improve their effectiveness.

Ozone Research

In 2001 Develop tropospheric ozone, NOx and SOx Air Quality Criteria Documents through planning, development, and consultation.

In 2000 Provide new info. on the atmospheric concentrations, human exposure, and health and environ. effects of trop. ozone and incorporate it and other peer-reviewed research findings in an External Review Draft of the Ozone AQCD for NAAQS review; complete the final Carbon Monoxide AQCD.

In 1999 Completed a release of Model-3/CMAQ-Version 2 for tropospheric ozone.

In 1999 The draft Comparative Risk Framework Methodology and Case Study was provided to the Science Advisory Board (SAB) Drinking Water Subcommittee for its review.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Final Carbon Monoxide Air Quality Criteria Document.		1		document
Add comparative Risk Framework Report				
Publish First External Review Draft of Ozone Air Quality Criteria Document for public comment and Clean Air Scientific Advisory Committee (CASAC) review.			1	draft AQCD

Baseline: Research in peer-reviewed publications is available but must be compiled and evaluated to assure complete consideration of relevant information in the standard setting process. The Clean Air Scientific Advisory Committee is preparing, with support from ORD, to evaluate the next series of criteria documents for tropospheric ozone, NOx and SOx.

PM Effects Research

In 2001 Provide new information on the atmospheric concentrations, human exposure, health effects and mechanisms of toxicity of particulate matter, and facilitate PM NAAQS review through Air Quality Criteria Document development and consultation.

In 2000 Provide new information on the atmospheric concentrations, human exposure, and health effects of particulate matter (PM), including PM2.5, and incorporate it and other peer-reviewed research findings in the second External Review Draft of the PM AQCD for NAAQS review.

In 1999 Three projects completed: 1) pilot study of methods to assess PM effects on changes in cardiovascular and inflammatory endpoints; 2) long-term exposures to PM and effects on mortality and lung function; and 3) Interagency agreement with NIAID to support EPAs part of Inner City Asthma study.

In 1999 Completed three reports on PM: (1) describing research designed to test a hypothesis about mechanisms of PM-induced toxicity; (2) characterizing factors affecting PM dosimetry in humans; and (3) identifying PM characteristics (e.g. composition) associated with biological responses.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Reports (1) describing research designed to test a hypothesis about mechanisms of PM-induced toxicity; 2) characteristc factors affecting PM dosimetry in humans; 3) ID PM characteristic (composition)				
Hold CASAC review of draft PM Air Quality Criteria Document.		09/30/2000		review
Complete longitudinal panel study data collection & preliminary report on exposure of susceptible subpopulations to total PM & co-occurring gases of ambient origin and i.d. key exposure parameters...		1		report
Data generated from PM monitoring studies in Phoenix, Fresno, and Baltimore will be used to reduce uncertainties on atmospheric PM concentrations in support of Draft PM Air Quality Criteria Document.		09/30/2000		data
Reports on (1) role of host susceptibility factors, such as compromised cardiopulmonary systems, on responses to PM exposures and (2) data on regional deposited dose of inhaled ultrafine particles.		09/30/2000		reports
Report on results from Baltimore study evaluating the cardio- vascular and immunological responses of elderly individuals to PM.		1		report
Delivery of computer model to assess the effect of spatial variability on human exposure as manifested by health.				
Reports on (1) long-term exposures to PM and effects on mortality and lung function.				
Complete PM longitudinal panel study data collection and report exposure data. Produce a peer reviewed research plan for population-based exposures to causal agents.			09/30/01	
Report on health effects of concentrated ambient PM in healthy animals and humans, in asthmatic and elderly humans, and in animal models of asthma and respiratory infection.			1	report
Final PM Air Quality Criteria Document completed.			1	final AQCD

Baseline: The standard setting process for criteria air pollutants relies upon evaluation of relevant, peer-reviewed research findings, which are documented in Criteria Documents produced approximately every 5 years. Current health risks suggest tens of thousands of individuals may die each year from PM exposures, and many more become ill. Recent research has indicated that a number of components or characteristics may contribute to PM toxicity. Most research has focused on a few characteristics, such as size fraction, transition metals, organic compounds, biologicals and acids. Little research has been done on ultrafine particles, peroxides, soot, sulfates and nitrates and more research is needed as well on the better studied components. Human studies have shown differences in dosimetry among population subgroups, such as asthmatics and individuals with small airway disease, and in response such as cardiac changes in elderly heart patients who respond differently than elderly normal individuals. Recent studies are also showing that patterns of exposure to elderly residents tend to follow central-site monitoring levels of fine PM, an important contribution

to estimating actual human exposure and estimating population health risks. New information is needed to address knowledge gaps identified by the scientific and policy communities (including the National Research Council) in many areas including atmospheric concentrations, human exposure, dosimetry, characteristics of PM producing effects, effects of PM and copollutants on toxicity, susceptible sub-populations, mechanisms of toxicity, and evaluation of uncertainty and error in measurements.

PM Measurement Research

In 2001 Provide new information on particulate matter source emissions, measurements, methods, and emissions-based air quality models to guide State Implementation Plan (SIP) development under the PM NAAQS.

In 2001 Awarded five (5) grants in June 1999 to establish Particulate Matter (PM) research centers for a period of five years, which will advance scientific understanding of the health effects of PM in the areas of exposure, dosimetry and modeling, toxicology, and epidemiology.

In 2000 Develop particulate matter (PM) measurements, methods, emissions-based air quality models, and source emissions and control information to guide State Implementation Plan (SIP) development under the current PM NAAQS.

In 1999 Release of Models-3/CMAQ-Version 2 for PM was completed.

In 1999 Completed four reports on the following topics: 1) wood stove PM emissions (draft); 2) fine PM and organic speciation of fireplace emissions (draft); 3) fine PM characterization of heavy duty diesel vehicle exhaust plumes (draft); and 4) characterizing PM emissions from mobile construction equipment.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Produce data on the size distribution of particles emitted from residential wood combustion (fireplace)				
Produce improved receptor models (CMB8 and UNMIX) for measurement of source category emissions impacts on air quality.		2		models
Complete a preliminary evaluation of Models-3/Community Multi-Scale Air Quality (CMAQ) for PM, demonstrating its potential reliability for PM NAAQS attainment planning		09/30/2000		evaluation
In 1999 establish five airborne particulate matter (PM) research centers to conduct integrated studies on PM exposure, dosimetry and extrapolation modeling, toxicology and epidemiology.				
Publish a report on the size distribution of particles emitted from diesel trucks under various on-road conditions to improve source inventories for NAAQS implementation.			1	report
Publish peer reviewed documentation of the PM components of Models-3/CMAQ.			1	documentation

Baseline: The management of particulate matter involves extensive characterization of current conditions and modeling of emissions and atmospheric processes to identify effective control strategies. At present, few data are available on atmospheric concentrations and significant uncertainties exist in the methods and atmospheric models used to link sources of PM and precursors to ambient concentrations. In the area of emissions, there are extensive uncertainties about the total PM mass emitted and the size distribution and

chemical composition of the primary particles emitted from a variety of sources (diesel trucks, residential wood combustion, off road vehicles, construction activities, industrial and energy production facilities). There are also uncertainties about how best to measure these emissions to account for immediate changes in particles which occur in the exhaust plume. Emissions of precursors (nitrogen oxides, sulfur oxides and ammonia) are much better understood with the exception of ammonia. In the area of air quality models, the Agency has recently released Models-3 to the environmental monitoring community. This modeling system takes advantage of the most recent advances in chemical transport, transformation, and fate but also enhancement in computer and computer program technologies. New and improved data sets on emissions and models are needed to support effective State Implementation Plan development.

Verification and Validation of Performance Measures

Performance Measure: Areas Designated for the 1-hour ozone standard

Performance Databases**:**

- AIRS —Aerometric Information Retrieval System is comprised of two major subsystems: 1) the Air Quality Subsystem (AQS) stores ambient air quality data (used to determine if nonattainment areas have the three years of clean air data needed for redesignation), and 2) the Airs Facility Subsystem (AFS) stores emissions and compliance/enforcement information for facilities.
- FREDS—The Findings and Required Elements Data System is used to track progress of states and Regions in reviewing and approving the required data elements of the State Implementation Plans (SIP). SIPs define what actions a state will take to improve the air quality in areas that do not meet national ambient air quality standards

Data Source**:**
AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS).
FREDS: Data are provided by EPA's Regional offices.

QA/QC Procedures**:** AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections. FREDS: No formal QA/QC procedures.

Data Quality Review**:** AIRS: No external audits have been done in the last 3 years. FREDS: None.

Data Limitations**:** AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors). FREDS: Potential data limitations include incomplete or missing data from Regions

New/Improved Data or Systems**:** AIRS: EPA is in the process of reengineering the AQS to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. The current AFS, which is a mainframe operation, will be replaced by a new ORACLE database that will also be accessible by the Internet. Both systems will be enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) being developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility. FREDS: None

Performance Measure: Reductions in Mobile Source VOC Emissions

Performance Database**:** AIRS

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors).

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractor(s) obtain some necessary information directly from other sources, for example weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions in several future years. When the method for estimating emissions changes significantly, EMD sometimes creates revisions to its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the

apparent emissions trend. EMD publishes on paper the national emission estimates; county-level estimates are available electronically.

It is useful to understand just what mobile source information is updated in Trends each year. An input is updated annually only if there is a convenient source of annual data for the input. Generally, VMT, the mix of VMT by type of vehicles (FHWA types, not EPA types, however), temperatures, gasoline properties, and the designs of I/M programs are updated each year. The age mix of highway vehicles is updated, using state registration data; this captures the effect of fleet turnover, assuming emission factors for older and newer vehicles are correct. Emission factors for all mobile sources and activity estimates for non-road sources are changed only when OMS requests this to be done and is able to provide the new information in a timely manner.

New/Improved Data or Systems: AIRS: EPA is in the process of reengineering the AQS subsystem to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. The current AFS, which is a mainframe operation, will be replaced by a new ORACLE database that will also be accessible by the Internet. Both systems will be enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) being developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility.

Performance Measure: Reduction in Mobile Source NOx Emissions

Performance Database: AIRS

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors).

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractor(s) obtain some necessary information directly from other sources, for example weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions in several future years. When the method for estimating emissions changes significantly, EMD sometimes creates revisions to its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes on paper the national emission estimates; county-level estimates are available electronically.

It is useful to understand just what mobile source information is updated in Trends each year. An input is updated annually only if there is a convenient source of annual data for the input. Generally, VMT, the mix of VMT by type of vehicles (FHWA types, not EPA types, however), temperatures, gasoline properties, and the designs of I/M programs are updated each year. The age mix of highway vehicles is updated, using state registration data; this captures the effect of fleet turnover, assuming emission factors for older and newer vehicles are correct. Emission factors for all mobile sources and activity estimates for non-road sources are changed only when OMS requests this to be done and is able to provide the new information in a timely manner.

New/Improved Data or Systems: AIRS: EPA is in the process of reengineering the AQS subsystem to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. The current AFS, which is a mainframe operation, will be replaced by a new ORACLE database that will also be accessible by the Internet. Both systems will be enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) being developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility.

Performance Measure: Areas Designated for PM 10 Standard

Performance Database: AIRS —Aerometric Information Retrieval System is comprised of two major subsystems: 1) the Air Quality Subsystem (AQS) stores ambient air quality data (used to determine if nonattainment areas have the three years of clean air data needed for redesignation), and 2) the Airs Facility Subsystem (AFS) stores emissions and compliance/enforcement information for facilities. FREDS—The Findings and Required Elements Data System is used to track progress of states and Regions in reviewing and approving the required data elements of the State Implementation Plans (SIP). SIPs define what actions a state will take to improve the air quality in areas that do not meet national ambient air quality standards.

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS). FREDS: Data are provided by EPA's Regional offices.

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program

(NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections. FREDS: No formal QA/QC procedures.

Data Quality Review: AIRS: No external audits have been done in the last 3 years. FREDS: None.

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors). FREDS: Potential data limitations include incomplete or missing data from Regions

New/Improved Data or Systems: AIRS: EPA is in the process of reengineering the AQS subsystem to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. The current AFS, which is a mainframe operation, will be replaced by a new ORACLE database that will also be accessible by the Internet. Both systems will be enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) being developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility. FREDS: None

Performance Measure: Reductions in Mobile Source PM 10 Emissions

Performance Database: AIRS

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors).

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractor(s) obtain some necessary information directly from other sources, for example weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions in several future years. When the method for estimating emissions changes significantly, EMD sometimes creates revisions to its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes on paper the national emission estimates; county-level estimates are available electronically.

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Performance Measure: Reductions in Mobile Source PM 2.5 Emissions

Performance Database: AIRS

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program,

the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors).

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractor(s) obtain some necessary information directly from other sources, for example weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions in several future years. When the method for estimating emissions changes significantly, EMD sometimes creates revisions to its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes on paper the national emission estimates; county-level estimates are available electronically.

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standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility.

Research

Goal 1 Objective 1

Performance Measure: Complete PM longitudinal study data collection and report exposure data. Produce a peer reviewed research plan for population-based exposures to causal agents.

Performance Database: Output Measure - Internal Tracking. No database required.

Data Source: N/A

QA/QC Procedures: N/A

Data Quality Review: N/A

Data Limitations: N/A

New/Improved Data or Systems: N/A

Performance Measure: Report on health effects of concentrated ambient PM in health animals and humans, in asthmatic and elderly humans, and in animal models of asthma and respiratory infection.

Performance Database: Output Measure - Internal Tracking. No database required.

Data Source: N/A

QA/QC Procedures: N/A

Data Quality Review: N/A

Data Limitations: N/A

New/Improved Data or Systems: N/A

Performance Measure: Final PM Air Quality Criteria Document completed.

Performance Database: Output Measure - Internal Tracking. No database required.

Data Source: N/A

QA/QC Procedures: N/A

Data Quality Review: N/A

Data Limitations: N/A

New/Improved Data or Systems: N/A

Coordination with Other Agencies

EPA cooperates with several other federal, state and local agencies in achieving goals related to ground level ozone and PM. The Agency worked closely with the Department of Agriculture in developing its agricultural burning policy. EPA, the Department of Transportation (DOT), and the Army Corps of Engineers work with state and local agencies to integrate transportation and air quality plans, reduce traffic congestion, and promote livable communities. The Agency worked with the Department of the Interior, National Park Service, in developing its regional haze program and deploying the IMPROVE visibility monitoring network. The operation and analysis of data produced by the PM monitoring system is an example of the close coordination of effort between the EPA and state and tribal governments.

EPA is working with the National Aeronautics and Space Administration (NASA) on technology transfer for using satellite imagery for pollution assessments and transports. The Agency works with the Department of Defense, Department of the Army, on advancing emission measurement technology. We also work with the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, for meteorological support for our modeling and monitoring efforts.

The Department of Energy (DOE) and DOT fund research projects to better understand the size, source, and causes of mobile source pollution. The DOT's mobile source projects include TRANSIMS (TRansportation ANalysis and SIMulation System) and other transportation modeling projects; DOE is funding these projects through the National Renewable Energy Lab. EPA also works closely with the DOE on refinery cost modeling analyses for EPA's clean fuel programs. For mobile sources program outreach, the Agency is participating in a collaborative effort with DOT's Federal Highway Administration and the Federal Transit Administration designed to educate the public about the impacts of transportation choices on traffic congestion, air quality and public health. This community-based public education initiative also includes the Centers for Disease Control. In addition, EPA is working with DOE to identify opportunities in the Clean Cities program.

Research

Tropospheric Ozone Research Program. Other than Criteria Document preparation which is EPA's responsibility alone, the Agency's core tropospheric ozone research program is coordinated with the research efforts of others and planned to achieve the most important unmet research needs that draw upon EPA's expertise. All exposure and risk management research in this area is coordinated through the efforts of the North American Consortium for Atmospheric Research in Support of Air Quality Management (NARSTO), a public/private partnership whose membership spans government, the utilities, industry, and academia throughout Mexico, the United States, and Canada. The remainder of the EPA tropospheric ozone research program focuses on needs associated with the review of the tropospheric ozone NAAQS and that research not being met by others.

Particulate Matter Research Program. The National Research Council PM research plan is the principal guideline for the Agency's particulate matter (PM) research program for the next several years. The plan also affects other agencies, with Congress expecting the EPA and other

federal agencies to review their ongoing PM research activities and, where appropriate, re-focus activities so as to be consistent with the NAS plan. The EPA has chosen to take a broad-based approach to PM research planning and program development. This approach extends participation in PM research planning to the private sector, in a manner similar to that used successfully for planning tropospheric ozone research.

The PM science planning community has pointed to the need to conduct its health effects and source-to-receptor research in close coordination, so that PM toxicology, epidemiology, and exposure research are each done in direct combination with the other two. They have stressed that none of the three should be planned and carried out on its own. EPA will continue to focus on such coordination and pursue a number of avenues to achieve public/private coordination and cooperation including: (1) playing a lead role in coordinating all federal agency research on PM health, exposure, and atmospheric processes under the Air Quality Research Subcommittee of the President's Committee on Environment and Natural Resources (CENR), 2) creating an open inventory of all public and private ongoing PM research, and 3) completing an ORD Research Strategy for PM which will benefit all organizations engaged in PM related research and which is currently available for review in draft form.

One key opportunity for coordination of research related to standards implementation is through expansion of NARSTO, which has changed its name (from North American Research Strategy on Tropospheric Ozone) and expanded its mission to include PM-related efforts. The NARSTO's Executive assembly has formally agreed to re-charter and expand its mission to encompass the PM issue. Complementary Federal/private coordination of effects-related research is under development, including that of the CENR/AQRS, and is being closely coordinated with the NARSTO expansion.

Statutory Authorities

Clean Air Act (CAA) (42 U.S.C. 7401-7671q)

Objective # 2: Reduce Emissions of Air Toxics

By 2010, reduce air toxic emissions by 75 percent from 1993 levels to significantly reduce the risk to Americans of cancer and other serious adverse health effects caused by airborne toxics.

Resource Summary
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
Reduce Emissions of Air Toxics	**$89,966.2**	**$95,123.4**	**$132,939.4**	**$37,816.0**
Environmental Program & Management	$46,345.0	$43,418.8	$55,154.1	$11,735.3
Science & Technology	$21,377.1	$22,650.9	$21,239.4	($1,411.5)
State and Tribal Assistance Grants	$22,244.1	$29,053.7	$56,545.9	$27,492.2
Total Workyears	371.5	380.5	385.6	5.1

Key Programs
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$22,244.1	$29,053.7	$30,845.9
Air Toxics Federal Standards	$24,637.9	$19,380.6	$27,312.3
Mobile Sources	$1,736.0	$2,431.0	$2,504.3
Air Toxics Research	$19,507.0	$18,121.7	$17,406.4
EMPACT	$171.7	$0.0	$490.0
Air Toxics Characterization	$9,088.2	$8,452.9	$9,503.7
Air Toxics Implementation	$10,561.6	$5,081.7	$5,692.0
Rent, Utilities and Security	$0.0	$847.7	$876.5
Administrative Services	$0.0	$821.9	$852.5

FY 2001 Request

Toxic air pollutants pose significant risks to public health by causing cancer and other serious health problems such as reproductive disorders, birth defects, and damage to the nervous system. Available data from U.S. cities indicate predicted increased lifetime cancer risks from air toxics may be on the order of 1 in 10,000. People who live near certain major industrial plants may face even higher cancer risks from air toxics.

The Clean Air Act Amendments of 1990 list 188 hazardous air pollutants (HAPs), which are emitted from a variety of sources, including mobile sources, stationary sources, and area sources. Emission rates vary across sources and by locale. For example, the 1993 National Toxic Air Pollutant Emissions by Source Inventory indicates that mobile sources accounted for approximately 21 percent of major air toxic emissions in urban areas, with point and area sources making up the rest. For several air toxics (e.g., benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and diesel particulate matter), mobile sources may contribute from 50 to 70 percent of the total inventory.

The Clean Air Act Amendments of 1990 contain a variety of provisions that address toxic air pollutants from all categories of sources. Title II of the Amendments, which contains mobile source requirements, calls on EPA to develop standards to control hazardous air pollutants from motor vehicles and their fuels. The vehicle and fuels standards must reflect the greatest degree of emission control that is technologically feasible taking into account cost, noise, energy, and safety factors. Title III of the Amendments, which contains stationary and area source requirements, lists the 188 HAPs and requires EPA to develop technology-based standards for major stationary sources of these pollutants. Eight years after promulgating these Maximum Achievable Control Technology (MACT) standards, EPA must evaluate the residual risk for the HAPs and revise the standards if needed to provide an ample margin of safety to protect public health or the environment.

Section 112 requires EPA to develop a national urban air toxics strategy to ensure achievement of statutorily mandated cancer and non-cancer risk reduction goals, to identify at least 30 of the most hazardous air pollutants found in the largest number of urban areas, and to potentially develop MACT or Generally Available Control Technology (GACT) standards for area sources that emit those 30+ pollutants, and to encourage and work with State and local air pollution programs to reduce risks in urban areas. In addition, the Act requires EPA, through the Great Waters Program, to study the effect of air toxics on ecosystems, particularly on important water bodies. Finally, Title III mandates control of air toxics from combustion sources with emphasis on mercury and analysis of emissions from steam powered utilities.

To carry out Clean Air Act requirements, EPA developed an air toxics program comprised of four key areas: (1) characterization of air toxics from stationary and mobile sources; (2) development of Federal technology-based and risk-based standards; (3) development of state, tribal, and local capacity to implement air toxics programs; and (4) carrying out research to support the air toxics program. In carrying out the air toxics program, EPA is now moving from the first phase of the program, developing technology-based standards, to the second phase, using a risk-based, multi-media approach. The second phase focuses on urban areas and large water bodies to address the risk that remains after the first-phase controls are in place. In this second phase, the Agency will:

- Monitor and characterize the air toxics problem and identify the sources of the most toxic chemicals that are transported through the air and that affect cumulative exposure, particularly in urban areas and major water bodies;

- Look cross-media at toxic air emissions from all sources and at air deposition impacts on the environment, as well as releases from traditional air toxics sources and their impacts on air quality;

- Implement a strategy that will obtain the greatest cumulative reduction in health risks due to air toxics, regardless of media, targeting urban areas and major water bodies where exposure to air toxics is the greatest; and,

- Continue to develop appropriate emission control strategies for mobile sources to ensure the greatest degree of control possible taking into account cost, noise, energy and safety factors, and expand these strategies to all mobile sources, including motor vehicles and their fuels and land-based nonroad, locomotive, marine and aircraft engines.

In 2001 EPA will continue to develop and apply assessment tools, develop regulations and guidance, and implement programs to reduce risk to the public. The Agency will use existing regulatory authorities (e.g., the Clean Air Act, the Clean Water Act) or negotiated agreements to address sources of concern identified through risk assessment.

Characterization of Air Toxics

EPA will continue to focus on reducing air toxics emissions through federal technology-based standards, as required by the Clean Air Act, while addressing the risk remaining from stationary sources after first-phase controls are in place. For mobile sources, EPA will quantify exposure and risk and develop cost-effective strategies for further emission control consistent with section 202(l). EPA is now completing development of the information and tools to broadly characterize the air toxics problem on a national scale and measure progress in improving public health and reducing environmental impacts. These efforts will allow the Agency to better characterize the risks from air toxics and to establish a baseline for measuring risk in carrying out the Government Performance and Results Act (GPRA). For 2001, EPA will continue to invest in improved and innovative monitoring and modeling, emissions inventories, and risk assessment tools to allow better characterization of urban and local scale problems and to address multi-media issues and multi-pathway exposures including a focus on identifying priority HAPs for Indian Country.

EPA is building on existing state, tribal, and local efforts to create a national monitoring and inventory program that better characterizes public exposures to hazardous air pollution. In general, existing monitoring efforts measure concentrations only for a limited number of toxic compounds and only at limited locations. EPA will work with states, tribes and local agencies to expand the air toxics monitoring program in urban areas and around major water bodies in order to better characterize air toxics; establish a centralized database on toxic compounds in urban areas including air, water, and solid waste; and update and improve the toxics emission inventories. EPA, in conjunction with DOD and DOE, will continue to evaluate and advance the development of new and improved continuous source monitoring technology for emissions of air toxics. EPA will also refine ongoing work with urban risk models to better estimate the exposure to air toxics through various media, and the risk to the public resulting from this exposure.

As a first step, EPA plans to use a national-scale air quality model, the Assessment System for Population Exposure Nationwide (ASPEN), developed as part of the Cumulative Exposure Project (CEP), as part of its efforts to better characterize the air toxics problem. The CEP estimated 1990 outdoor concentrations of toxic air pollutants across the entire country for all source categories (e.g., cars, large stationary sources, and smaller sources). The National Air Toxics Assessment project, will use the ASPEN model based on an updated and more detailed emission inventory; evaluate the model with expanded ambient monitoring information; and, integrate an exposure model, the Hazardous Air Pollutant Exposure Model (HAPEM), to better assess the public health effects. The application of the ASPEN and HAPEM will provide a basis for evaluating the effectiveness of nation's air toxics programs. Through the increased data collection efforts on air toxics underway, EPA also will be focusing on local hot spots and providing support in environmental justice issues.

The Agency will evaluate and improve local-scale model efforts to support local evaluations and try to make them more resource efficient.

EPA also plans to model air deposition emissions on a national scale using REMSAD. The output from this assessment will be used to provide information to other programs (such as State programs) which can then use the information for obtaining reductions in the emissions which create air deposition problems. The plan will also be used to identify national regulatory solutions to the air deposition problem.

The Agency also will continue to evaluate health testing results and protocols from the motor fuels industry to increase information on public health risks. The Fuels and Fuel Additives Registration (FFAR) program will provide for the review and screening of potential toxic substances prior to introduction into motor vehicle fuel supplies. The FFAR registration program will continue involving approximately 2,000 fuel manufacturers, 3,000 gasoline and diesel fuels registrations and 6,000 additive registrations; approximately 10,000 registration reports will be submitted. EPA will continue fuel additive health testing for traditional gasolines and gasolines containing metallics such as Methylcyclopentadienyl Manganese Tricarbonyl (MMT) and oxygenates such as Methyl Tertiary-Butyl Ether (MTBE). A large amount of public concern has arisen in various parts of the country regarding the health effects of various fuels and fuel additives including oxygenates and metallics. Data currently available is insufficient to make complete risk assessments. This health testing would allow for a more complete evaluation of the risk associated with the use of these types of additives and action could be taken if an unacceptable risk is present. EPA will provide guidance for Phase II of the reformulated gasoline program. EPA will begin establishing sulfur baselines for all U.S. gasoline refiners and importers, and producing a new reporting system for the gasoline sulfur reduction program.

By the end of 2001, EPA will make further progress in linking release and exposure information from the various media programs to determine multi-media toxics exposure and use this information to develop cross-media strategies to more effectively reduce urban exposures to toxic emissions. EPA will continue to identify patterns in exposure to toxics that will be the basis for coordinated approaches that will most efficiently reduce exposure.

Development of Federal Standards

EPA will continue to carry out the mobile source standard-setting requirements of Title II of the Act through several activities. The Agency will continue to assess the need for and the feasibility of controlling emissions of unregulated toxic air pollutants associated with motor vehicles and fuels. In 2000, EPA will publish a notice to address the requirements of §202(l) of the Clean Air Act including proposed standards if appropriate, addressing the control of mobile source hazardous air pollutants. This notice will address, at a minimum, benzene and formaldehyde. As part of this process, EPA is examining exposure and potential risk in a number of urban areas as well as on a nationwide basis. The Agency will complete final action under §202(l) in FY 20001.

EPA also will implement its toxic control programs for mobile sources through existing engine certification, compliance, and fuel quality requirements related to emissions standards that also control toxics. Under these requirements, engine vehicle manufacturers are required to certify any engine vehicle entered into commerce in the United States as meeting the emission limits set by EPA. Fuel refineries demonstrate compliance by submitting survey data to EPA. These implementation requirements can be supplemented by state and local action in the form of inspection and maintenance programs and local fuel testing. In addition, EPA will begin the stakeholder process to plan implementation of the national gasoline sulfur standard.

Under Title III of the Clean Air Act, EPA has completed all of the two-, four-, and seven-year MACT standards. Through January 2000, we have proposed four 10-year standards and promulgated one. The estimated emission reductions from the rules already promulgated are over 1.5 million tons per year. Once all of the 10-year standards are promulgated, the Agency estimates an additional 500,000 tons of emission reductions per year.

In 2001, EPA will focus its efforts on completing the remaining 10-year MACT standards (covering 94 of the total 174 source categories) and expects to propose the remaining 27 standards. These include a standard covering reciprocating internal combustion engines with over 30,000 facilities, a standard covering over 10,000 municipal landfills, and a standard for miscellaneous organic hazardous air pollutants which covers 23 different source categories and is expected to reduce air toxic emissions by over 100,000 tons annually. In developing the 10-year MACT standards, EPA will continue to streamline the standard-setting process by building on experience from earlier standards and by providing greater flexibility for states and tribes that want to achieve the emission reductions, but in ways that are different from those proposed by EPA.

EPA will continue the extensive residual risk analyses for already promulgated MACT standards to determine if additional residual risk standards are necessary. These analyses will require significant source testing to measure the emissions allowed by MACT standards. These additional standards will protect the public health by reducing the number of people exposed to unhealthful levels of hazardous air pollutants and prevent adverse environmental effects.

In carrying out the 1999 Integrated Urban Air Toxics Strategy, the Agency will initiate the development of additional national urban area source standards. Area source standards would be developed for hazardous air pollutants judged to pose the greatest threat to public health in the largest number of urban areas.

As part of its reinvention efforts, the Agency will continue to investigate opportunities in the residual risk standards and the urban air strategy for possible coordinated data gathering and rulemakings efforts that address releases of toxics to air, water, and land and that consider pollution prevention approaches. To develop these analyses, EPA will bring together multiple ongoing efforts such as: (1) the Persistent Bioaccumulative Toxics (PBT) program; (2) the Cumulative Risk program; (3) the Total Maximum Daily Load (TMDL) program in water; and, (4) urban programs.

Section 129 of the Clean Air Act requires the establishment of performance standards for four categories of waste incinerators. These categories include: municipal waste combustors, medical waste incinerators, industrial and commercial waste incinerators, and other solid waste incinerators. EPA will promulgate regulatory options for industrial and commercial waste incinerators. EPA will provide guidance for implementing the rules promulgated for municipal waste incinerators and commercial and industrial solid waste incinerators.

Air Toxics Implementation

EPA believes that Federal standards for controlling emissions of hazardous air pollutants from area and stationary sources can be most effectively implemented by states, tribes, and local agencies. EPA delegates its implementation authority and provides tools and guidance to ensure smooth and consistent implementation. EPA will publish guidance, provide support in issue resolution, and conduct outreach activities to help sources comply as well as provide support to tribes to implement MACT standards on reservation lands. EPA will use emissions testing and, where feasible, continuous emission monitoring to monitor compliance with MACT and other air toxics standards. Emissions inventories can be used in implementing other air toxics rules such as urban toxics. EPA also will develop capabilities for greater community right-to-know access (e.g., using the Internet) to data that will show the level of toxic compounds in urban areas.

EPA will perform studies related to: (1) air toxic deposition into our nation's water bodies; (2) air toxic emissions from electric utilities; and (3) the urban air toxics problem. OAR will rely on research from the Office of Research and Development (ORD) in these areas. EPA will continue its work to assess and reduce threats posed by air toxic deposition to water bodies and to develop and implement progress to reduce risk in urban areas.

EPA will examine exposure of populations to toxic releases from all media and develop media-specific strategies to reduce emissions and exposures using existing statutory authority, where necessary and appropriate, and relying on available source characterization information. These include §202(l) of the Act, which gives EPA the authority to set hazardous air pollutant emission controls for motor vehicles and their fuels, and §211(b), which contains requirements for fuels and fuel additives testing. EPA also will begin developing a multimedia toxics exposure model using each office's media information. This will allow comparisons of effectiveness of various programs.

The EPA will continue its efforts to address and prevent adverse effects of atmospheric deposition of toxics and nitrogen compounds in the Great Waters. In 2001, EPA will continue to work with the Office of Water, the Office of Research and Development, and others to develop and support multi-media regulatory approaches to reduce risks, including enhancing technical tools for EPA and states to use to assess cross-media transport of pollutants, and facilitating state, tribal, and regional deposition reduction strategies. Also in 2001, the EPA will develop an action plan to assess atmospheric deposition on a national basis. This action plan will include: modeling atmospheric deposition emissions on a national level; examining the rules or activities in place to address impairment caused by atmospheric deposition; and determining what, if any, additional actions are necessary to address impairment caused by atmospheric deposition.

EPA published the Integrated Urban Air Toxics Strategy in 1999. This strategy identified the hazardous air pollutants that pose the greatest threat in the largest number of urban areas and the area source categories that emit these pollutants. Implementation of this strategy assures that 90 percent of the emissions from urban area sources are subject to regulation. The strategy contains a schedule of activities to ensure: a substantial reduction in noncancer health risk; a 75 percent reduction in cancer incidence; a focus on disproportionate risk; highlighting mobile source emissions contributions; and encouraging state, local, and tribal programs to develop strategies for their communities. In 2000 and 2001, EPA will continue to improve our national characterizations of risk from air toxics in urban areas and work closely with states, local, and tribal governments to develop or strengthen programs to reduce cumulative risk.

In addition to the studies being performed under the Clean Air Act, EPA will work to reduce the emissions and lower the risk associated with PBTs. The air program will work to achieve these reductions through regulatory and prevention-based measures. OAR will develop tools to evaluate the impact of PBTs and the impact of reductions in PBTs on human health and the environment. This effort will be coordinated across the Agency with the Office of Prevention, Pesticides, and Toxic Substances and others.

Research

EPA's air toxics research supports the investigation and assessment of the risks posed by toxic air pollutants and their mixtures from major stationary sources, urban area sources, mobile sources and indoor sources. The focus of the air toxics research program in FY 2001 will be on developing tools to perform integrated multimedia assessments on national, regional, and urban/local scales. The Agency also will place a greater emphasis on research that will focus on the exposures and risks from indoor air and mixtures, and risks to susceptible populations.

The air toxics research program contributes to the strategic objectives of making the air safe and healthy to breathe, especially for those with respiratory disease, and protecting the environment, by improving the scientific understanding of air toxics health risks and the effectiveness of risk reduction strategies. Research conducted under the program provides critical scientific information to Agency program offices and Regions necessary to develop, implement, and evaluate risk management options. In addition, the program provides improved tools for environmental assessment so that information developed by the Agency and others is more easily used and understood.

For FY 2001, the Agency has requested resources for important air toxics research that will provide new information and methods to estimate human exposure and health effects from high priority urban air toxics, and allow EPA to complete health assessments for the highest priority hazardous air pollutants, including fuel/fuel additives. This research furthers the objective of reducing air toxics emissions (and thereby reducing associated adverse health effects) by enabling the Agency to identify and quantify airborne toxics and their potential health risks.

Other activities planned for FY 2001 include evaluating cancer and non-cancer health effects from air toxics exposures, improving methods for extrapolations of health data from animals to humans to improve our understanding of health effects and risk assessment methods, and developing techniques to characterize health outcomes associated with urban toxics from long-term, multi-disciplinary studies.

Research planned for FY 2001 also includes beginning work on developing an urban scale air toxics human exposure model for community-based assessment for air toxics with known emissions and air chemistry to assist in evaluating emission control strategies. In addition, research will be conducted on clinical and animal studies to determine health effects of exposure to mixtures of pollutants, especially those common to urban environments. This will aid in understanding the mechanisms by which mixtures of air pollutants produce adverse health effects.

The Agency will evaluate health endpoints, (e.g. respiratory toxicity, immunotoxicity, neurotoxicity and reproductive toxicity), chronic mortality and morbidity, and risks to potential sensitive subpopulations, to determine if urban mixtures induce or exacerbate sensitivity. Two other activities that will continue are: 1) research to determine factors associated with micro-environmental exposures to air toxics (e.g., associated with traveling in an automobile) which are important to modeling and assessing personal-scale exposures; and 2) development of integrated control and pollution prevention approaches for source categories (e.g. utilities, manufacturing facilities, waste combusters) which are having the greatest impact on urban air quality.

Air pollution from mobile sources has been estimated to account for a significant portion of the nationwide emissions of air toxics, ozone precursors (volatile organic compounds and nitrogen oxides), and carbon monoxide. In the emissions characterization area, constantly changing fuels and fuel additives (e.g., oxygenates) and vehicle and engine designs require new testing to determine the effect on emissions rates of CO and toxic compounds. Continuing activities in this area include: 1) characterizing toxics emissions from mobile source combustion of alternative fuels under both real-world and test chamber conditions; 2) providing limited technical support, including the development and application of approaches for assessing cumulative exposures to air toxics from combustion of new fuels and fuel additives; and 3) characterizing emissions and attendant risks associated with new fuels and fuel additives. Ongoing consultation on risk assessments and waiver requests for fuels and fuel additives, review of industry data, and assessments comparing the risks and benefits of new fuels and fuel additives to conventional fuels will support the control of hazardous air pollutants (HAPs) from motor vehicles.

FY 2001 Change from FY 2000 Enacted

EPM

- (+$10,600,000) The Agency continues to retarget resources from setting MACT and residual risk standards to better characterizing the total environmental toxic risk, particularly in urban areas. The goal of this shift is to provide better information to communities on how individual factors in urban areas cumulatively affect public health and to make cross-media decisions to target the worst factors first. Thus, both nationally and locally, we would be moving toward programs and policies that are focused primarily on human and ecological risk reductions, as opposed to solely emission reductions. The Agency will use a multi-media, multi-pollutant approach to reducing risk. The Agency believes such an approach will produce greater, less costly risk reductions than would otherwise occur from following a media-by-media, pollutant-by-pollutant statutory agenda for air toxics. EPA will also increase resources for developing tools and guidance for the smooth and effective implementation of standards. These tools will include published guidance and support in resolving rule implementation issues. EPA will also expand outreach activities to help sources comply.

S&T

- (-$475,000) Funding to support a National Research Council study of the Clean Air Program, a Congressional earmark in 2000, will not be continued.

STAG

- (+$25,700,000) Clean Air Partnership Fund. The Fund will provide an opportunity for cities, states, and tribes to partner with the private sector, Federal government and each other to provide healthy clean air to local citizens. The fund will demonstrate smart multi-pollutant strategies that reduce greenhouse gases, air toxics, soot, and smog to protect our climate and our health.

  The Clean Air Partnership Fund will: be a catalyst for innovative local, state, private partnerships for air pollution reductions; demonstrate locally managed, self-supporting programs that achieve early integrated reductions in soot, smog, air toxics, and greenhouse gases; be used to capitalize local revolving funds and other financial mechanisms that leverage the original federal investment and result in greater resources for air pollution reduction; and, stimulate technology innovation.

  The Clean Air Partnership will fund more optimal, multi-pollutant control strategies. Currently, businesses and municipalities often invest in short-term, single-pollutant control approaches. The Partnership will encourage many industries, such as electric utilities and the transportation sector, to pursue comprehensive criteria pollutant reductions while improving energy and operation efficiencies, thereby also reducing greenhouse gas emissions. The Clean Air Fund will provide these needed resources through mechanisms that promise significant leveraging of non-Federal resources. It is expected that the Fund will support the development of local revolving funds which will provide low-interest loans, matching funds, public-private partnerships, and other capitalization mechanisms.

Research

S&T

While overall there are minor changes in the air toxics resource levels, there are some redirections in the research program reflected in the discussion below.

- (+$2,939,800, +3.5 workyears) The request includes an increase for research to define urban air toxics health risks. Included under this research will be determinations of dose-response relationships and the range of non-cancer health effects of high priority air toxics under various exposure scenarios. Methods research will be conducted on mobile source emissions. Exposure modeling and characterization will combine microenvironmental and ambient air toxics monitoring methods and modeling tools for the development of personal to urban scale residual risk assessments. This work includes developing and validating a model for urban to regional scale assessments of multiple source exposure impacts over varying time scales and climate conditions for specific high priority urban air toxics.

- (+$632,800, -0.1 workyears) This increase is for research supporting air toxics emissions characterization, controls and prevention. The goals of this research are to develop improved techniques to characterize hazardous air pollutant emissions from outdoor and indoor sources and to use these techniques to better understand the relative contribution of specific sources to actual human exposure, as well as to identify innovative low-cost approaches to control or prevent hazardous air pollutant (HAP) emissions. The information generated through this research will support improved characterization of risks posed by HAPs and development of future risk management strategies to reduce exposure.

- (-$816,500, +1.0 workyears) The R&D program, including infrastructure support costs, is spread across eight of the ten goals in the Agency's GPRA/budget structure. Based on a review of actual infrastructure utilization under each goal (i.e., utilization of workyears and associated PC&B, travel, operating expenses, and working capital fund), adjustments are being made across goals to more accurately reflect expectations for use in FY 2001.

- (-$924,400, -1.0 workyears) In FY 2001, the Request does not include resources to support Requests for Applications (RFAs) addressing long-term urban air toxics issues. This research has focused on characterizing the risks posed by individual and mixtures of air toxics, and identifying how the most significant sources of urban air toxics and their contribution to risk can be quantified. These resources are being redirected to support RFA's in other high priority research programs.

- (-$2,547,000) The 2001 request is $2,547,000 below the 2000 Enacted budget level due to Congressional earmarks received during the appropriations process that are not part of the 2001 President's Request.

Annual Performance Goals and Performance Measures

Reduce Air Toxic Emissions

In 2001	Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 5% from 2000 (for a cumulative reduction of 35% from the 1993 level of 4.3 million tons per year.)
In 2000	Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 3% from 1999 (for a cumulative reduction of 30% from the 1993 level of 4.3 million tons.)

In 1999 Air toxics emissions nationwide from stationary and mobile sources combined were reduced by 12% from 1998 (for a cumulative reduction of 27% from the 1993 level of 4.3 million tons.)

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Combined Stationary and Mobile Source Reductions in Air Toxics Emissions	12	3	5	Percent

Baseline: In 1993, the last year before the MACT standards and mobile source regulations developed under the Clean Air Act were implemented, stationary and mobile sources emitted 4.3 million tons of air toxics. Air toxics emission data are revised every three years to generate inventories for 1993, 1996, 1999, etc. Reductions are estimated from regulatory controls in the years between the three year updates.

State Implementation of MACT Standards

In 2000 Ensure state implementation of 100% of promulgated MACT standards for major sources.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request

Baseline: Following passage of the 1990 Clean Air Act Amendments, EPA identified 174 source categories for which MACT standards should be promulgated. As MACT standards are promulgated each year, the number becomes the baseline for the percentage of MACT standards to be implemented.

Promulgate Technology Based Standards

In 2001 Propose 27 technology based standards for control of hazardous air pollutants for the 10 year bin.

In 2000 Promulgate technology based standards for source categories of industrial facilities posing the greatest risks.

In 1999 Promulgated 16 MACT Standards for 26 source categories.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Number of MACT Standards Promulgated		5		Sources
Promulgate 12 MACT Standards for 24 source categories	16			Sources
Federal Register Publication of Final MACT Standards			25	Notices
Number of proposed MACT standards.			27	Proposed

Baseline: Following passage of the Clean Air Act Amendments, EPA identified 174 source categories for which MACT standards were to be promulgated. This became the baseline for MACT standards.

Research

Human Exposure and Health Effects Methods

In 2001 Provide new information and methods to estimate human exposure and health effects from high priority urban air toxics, and complete health assessments for the highest priority hazardous air pollutants, including fuel/fuel additives.

In 2000 Provide methods to estimate human exposure and health effects from high priority urban air toxics, and complete health assessments for the highest priority hazardous air pollutants (including fuel/fuel additives).

In 1999 Two reports were completed on pharmocokinetic models for cross-species and cross-pollutant extrapolation and extrapolation across concentration and time to support health risk assessment for acute exposures.

In 1999 The noncancer RfC and RfD assessment document for benzend is in the final stage of issue resolution. It is currently scheduled for completion in the first half of FY 2000.

In 1999 Dose-response assessments for dichloropropene, cadmium, EGBE, and acetonitrile were completed in FY 1999. The fifth assessment, for vinyl chloride, was delayed and will be completed in FY 2000. This delay will not have an impact on achievement of the strategic objective.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Complete four toxicological reviews and assessments (RfC, RfD, cancer unit risks) of high priority to the Air Program				Assessment
Benchmark dose software available for public use.				
Benzene RfD and RfC, Diesel, 1-3 Butadine Mobile Source Assessments				
Produce process and framework for incorporating Acute Reference Exposure (ARE) values into IRIS		09/30/2000		framework
Submit for Agency consensus review three toxicological reviews and assessments (RfC, RfD, cancer unit risks) of high priority to the Air Program.		5		assessments
Report on extrapolation across concentration and time to support health risk assessment for acute exposure				
Validation of a physiologically-based pharmocokinetic model for neurotoxic air toxics, including animal and human data.			1	model validat'n
Complete for external review three draft toxicological reviews and assessments of high priority to the Air Program to include fuel/fuel additives.			3	reviews

Baseline: The exposures and cancer and non-cancer health risks from air toxics exposures are largely speculative. The speculation is due to limitations in data on the exposures of humans to air toxics and uncertainty in the identification of hazard and health effects from the exposures. Actual human exposure and health effects data are available for very few air toxics thus extrapolations are necessary from animal toxicology studies, or from human exposure modeling, to estimate risks. By the end of FY01, cancer and/or noncancer dose response assessments will be completed for 12 of the 33 chemicals identified as high priority urban air toxics.

Air Quality Model Incorporating Air Toxics

In 2001 Develop (1) an air quality model incorporating air toxics as their air chemistry and emissions become known and (2) source emissions and control information for both mobile and stationary sources to guide cost-effective risk management

In 2000 Develop an air quality model incorporating air toxics as their air chemistry and emissions become known, and source emissions and control information for both mobile and stationary sources to guide cost-effective risk management options.

In 1999 A preliminary version of the urban scale Models-3/Toxics Model for a community-based human exposure assessment for air toxics was scheduled to be completed in October 1999.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Complete four toxicological reviews and assessments (RfC, RfD, cancer unit risks) of high priority to the Air Program				Assessment
Begin evaluation of the recently dev. urban scale Models-3/Toxics Model, to be used for community-based human exposure assessment for air toxics, using data sets for mercury and semi-volatile compounds.		09/30/2000		evaluation
Complete operational evaluation of Models-3/CMAQ for mercury.			1	evaluation

Baseline: Risk management efforts will be refocused as the urban air toxics program moves in the next few years to reduce health risks in cities, and residual risk assessments are used to target additional controls beyond Maximum Achievable Control Technology requirements. Current emissions and air quality models are limited in their ability to support effective control strategy development due to the complexity of air chemistry and physical processes and the multitude of emissions sources for many hazardous air pollutants. Available data on air toxic emissions has recently been compiled to support development of the urban air toxics strategy. Overall, data for large stationary sources are better than the data which exist for area sources (automobiles, trucks, off-road vehicles, automobile refinishing shops etc.) Improvements in area source data will be critical to future development of standards which adequately protect human health from all sources of the most hazardous toxic pollutants. Similarly, there are technologies available to reduce emissions from most major sources; however, in many cases, the approaches available for small area sources are quite costly due to the low concentrations emitted. Research on innovative prevention and control approaches which can reduce costs are needed for these sources.

Verification and Validation of Performance Measures

Performance Measure: Combined Stationary and Mobile Source Reductions in Air Toxics Emissions

Performance Database: National Toxics Inventory (NTI)

Data Source: The first NTI (for base year 1993) includes emissions information for 188 hazardous air pollutants from more than 900 stationary sources. It is based on data collected during the development of Maximum Achievable Control Technology (MACT) standards, state and local data, Toxic Release Inventory (TRI) data, and emissions estimates using accepted emission inventory methodologies. The 1996 NTI contains facility-specific estimates and will be used as input to National Air Toxics Assessment (NATA) modeling. (ASPEN, a dispersion model, contributes to NATA modeling.) The primary source of data in the 1996 NTI is state and local data. The 1996 state and local facility data are supplemented with data collected during the development of the MACT standards and TRI data. The NTI includes emissions from large industrial or point sources, smaller stationary area sources, and mobile sources.

QA/QC Procedures: Since the NTI is primarily a database designed to house information from other primary sources, most of the QA/QC efforts have been to identify duplicate data from the different data sources and to supplement missing data. There has been no effort to validate information collected from other databases, but a significant effort is underway to determine the best primary source data when a discrepancy among data sources is found. Mobile source data are validated by using speciated test data from the mobile source emission factor program, along with peer-reviewed models which estimate national tons for the relevant year.

Data Quality Review: Each base year's NTI has been reviewed by internal EPA staff, state and local agencies, and industry

Data Limitations: The NTI contains data from other primary references. Because of the different data sources, not all information in the NTI has been compiled using identical methods. Also, for the same reason, there are likely some geographic areas with more detail and accuracy than others. Because of the lesser level of detail in the 1993 NTI, it is not suitable for input to dispersion models.

New/Improved Data or Systems: The 1996 NTI is a significant improvement over the 1993 NTI because of the added facility-level detail (e.g., stack heights, latitude/longitude locations, *etc.*), making it useful for dispersion model input. Future inventories (1999, 2002, *etc.*) are expected to improve significantly because of increased interest in the NTIs by regulatory agencies, environmental interests, and industry, and the greater potential for modeling and trends analysis.

Coordination with Other Agencies

EPA coordinates with many organizations and other agencies to achieve reductions of risk from air toxics. EPA works with the Department of Energy (DOE) on several fuels programs. Other programs targeted towards the reduction of air toxics from mobile source are coordinated with the Department of Transportation (DOT). These partnerships can involve policy assessments and toxic emission reduction strategies in different regions of the country. Other federal agency partnerships have been created to share costs for researching health effects and collecting ambient air toxic monitoring data.

EPA is also forming a partnership with the Department of Defense (DOD) in the development of new continuous source monitoring technology for toxic metals emitted from smokestacks. This partnership will provide a new source monitoring tool that will streamline source monitoring requirements that a number of DOD incinerators are required to meet and improve the operation of DOD incinerators with real-time emissions information resulting in reduced releases of air toxics to the environment. In time, this technology is expected to be available for use at non-DOD facilities.

EPA also works closely with the DOE on refinery cost modeling analyses for EPA's clean fuel programs. For mobile sources program outreach, the Agency is participating in a collaborative effort with DOT's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) designed to educate the public about the impacts of transportation choices on traffic congestion, air quality and public health. This community-based public education initiative also includes the Centers for Disease Control (CDC). In addition, EPA is working with DOE to identify opportunities in the Clean Cities program.

The Agency is continuing to work closely with the Office of Safety Health Administration (OSHA) to coordinate the development of EPA and OSHA standards, where necessary, to ensure that MACT standards designed to reduce air toxic emissions do not inadvertently increase worker exposures. EPA also works closely with other health agencies such as the CDC and the National Institute of Environmental Health Sciences on health risk characterization. To assess atmospheric deposition and characterize ecological effects, EPA works with the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service.

The Agency has worked extensively with the Department of Health and Human Services (HHS) on the National Health and Nutritional Evaluation Study (NHANES) to identify mercury accumulations in humans. We have also worked with the Department of Energy on the 'Fate of Mercury' study to characterize mercury transport and traceability in Lake Superior.

Research

EPA's air toxics research is coordinated with other federal agencies through the Subcommittee on Air Quality Research of the Committee on Environment and Natural Resources Research (CENR). In addition, the Agency is developing an Air Toxics Research Strategy which is expected to undergo external peer review, e.g., EPA's Science Advisory Board (SAB), in 2000.

Statutory Authorities

Clean Air Act Title I, Part A and Part D, Subparts 3 and 5 (42 U.S.C. 7401-7431, 7512-7512a, 7514-7514a) (15 U.S.C. 2605)

Clean Air Act, Title II, Section 202 (l)(2)

Clean Air Act, Title IV (42. U.S.C. 7641-7642)

Objective # 3: Attain NAAQS for CO, SO2, NO2, Lead

By 2005, improve air quality for Americans living in areas that do not meet the NAAQS for carbon monoxide, sulfur dioxide, lead, and nitrogen dioxide.

Resource Summary
(Dollars in Thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
Attain NAAQS for CO, SO2, NO2, Lead	**$40,071.7**	**$44,103.4**	**$39,111.4**	**($4,992.0)**
Environmental Program & Management	$15,163.0	$17,664.0	$19,176.0	$1,512.0
Science & Technology	$113.2	$509.9	$140.1	($369.8)
State and Tribal Assistance Grants	$24,794.5	$25,929.5	$19,795.3	($6,134.2)
Oil Spill Response	$1.0	$0.0	$0.0	$0.0
Total Workyears	165.7	194.2	193.9	(0.3)

Key Programs
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$24,794.5	$25,929.5	$19,795.3
Mobile Sources	$110.0	$129.9	$140.1
Stationary Sources	$14,641.4	$16,566.5	$17,812.9
Administrative Services	$0.0	$162.0	$167.3
Regional Management	$0.0	$28.8	$191.3

FY 2001 Request

Under the Clean Air Act, EPA must set NAAQSs for pollutants that endanger public health and the environment. These pollutants include CO, SO_2, NO_2, and lead. States, tribes, and local agencies must develop clean air plans to meet the standards. These plans take into account the results

of Federal pollution control measures (e.g., motor vehicle emission standards). Each pollutant and the programs that reduce it are described separately below. This objective also includes cross-pollutant preconstruction and operating permit programs.

Carbon Monoxide

CO is a colorless, odorless gas that enters the bloodstream and interferes with the delivery of oxygen to the body's organs and tissues. The health threat from exposure to low ambient concentrations of CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, decreased learning ability, and difficulty in performing complex tasks.

CO is formed when carbon in fuels is not burned completely. It is a component of highway vehicle exhaust, which accounts for 60 percent of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. As vehicle miles traveled continue to increase each year, these emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators.

EPA has set standards for CO and currently assists states, tribes, and local agencies in implementing strategies to reduce CO pollution and maintain compliance with the standard. CO tends to be a local pollution problem and is not transported from one area to another. Clean air plans for CO include many mobile-source related programs such as auto tailpipe standards and oxygenated gasoline. There has been a significant downward trend in concentrations and emissions of CO. Approximately 35 areas, including unclassified areas, still do not meet the CO air quality standard set to protect public health.

In 2001 EPA will continue to assist states, tribes, and local agencies in implementing strategies to reduce CO pollution and maintain compliance with CO standards. The Agency will carry out mobile source programs (such as oxygenated fuel and reformulated gasoline) and assist in implementing attainment and maintenance plans. The Federal auto emission standards program and state vehicle inspection/maintenance programs will continue to assure CO control. EPA will continue providing technical and programmatic guidance for implementing oxygenated fuels programs and will provide information to the scientific community and stakeholders on the environmental aspects of the use of oxygenated fuels, and make recommendations to improve the program. As a result of these efforts, EPA expects an additional 12 areas to attain the NAAQS for CO in FY 2001.

EPA is currently reviewing the NAAQS for CO and plans to propose to revise or reaffirm the standard in 2000, with promulgation following in 2001.

Sulfur Dioxide

SO_2 belongs to the family of gases called sulfur oxides (SO_x). These gases are formed when fuels (mainly coal and oil) containing sulfur are burned, and during metal smelting and other industrial processes. The major health concerns associated with exposure to high concentrations of SO_2 include affects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Children, the elderly, and people with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema), are most susceptible to adverse health effects associated with exposure to SO_2. In the atmosphere SO_2 can react to form fine particles which may aggravate respiratory disease and lead to premature death. SO_2 is also a precursor to sulfates, which are associated with acidification of lakes and streams, accelerated corrosion of buildings and

monuments, and reduced visibility. Approximately 31 areas still do not meet the NAAQS for SO_2.

EPA will continue to ensure that all areas are in compliance with the standard and will review the standard, as the Clean Air Act mandates, to ensure that it adequately protects human health. The courts have remanded the most recent review of the SO_2 standard for further explanation of the decision to reaffirm. Final notice on the standard and the associated guidance is scheduled to be completed no later than the end of 2000. The final intervention level policy will give states guidance on identifying and addressing high, short-term peaks that occur for short durations (five minutes) but that can cause bronchial constriction in asthmatics, a serious health concern. In 2001, EPA will provide guidance to states and tribes on implementing the intervention level program. EPA will increase efforts to reduce the more pervasive sulfur oxides through the acid rain, particulate matter, and regional haze programs that are described under those objectives. These efforts will result in 2 additional areas coming into compliance with the SO_2 NAAQS in FY 2001.

Nitrogen Dioxide

NO_2 belongs to a family of highly reactive gases called nitrogen oxides. Nitrogen oxides form when fuel is burned at high temperatures, and result primarily from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. Ambient concentrations of nitrogen oxides can affect human health and ecosystems and also serve as precursors to ozone and particulate matter. Nitrogen oxides react with volatile organic compounds in the presence of sunlight to form smog. Nitrogen dioxide can be converted into fine nitrate aerosols, a constituent of fine particles ($PM_{2.5}$). In addition, it is a strong oxidizing agent and reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates. Nitrogen oxides irritate the lungs and lower resistance to respiratory infections such as influenza. They can also have adverse effects on both terrestrial and aquatic ecosystems, contributing to acid rain and eutrophication in coastal waters.

EPA has made progress toward reducing the emissions of nitrogen oxides and achieving the goal of having all areas in attainment for NO_2 by 2005. Over the next several years we will continue to work to maintain air at safe levels of NO_2. We will also review the standard to assure that it continues to protect public health and welfare.

Because NO_2 is a tropospheric ozone precursor, control of NO_2 is a way to reduce ozone. The narrative for the tropospheric ozone objective describes efforts to reduce the more pervasive nitrogen oxides in the acid rain and mobile source programs, encouraging market-based, low-cost pollutant trading. These programs will simultaneously address nitrogen oxides, tropospheric ozone, and fine particulate matter.

Lead

Exposure to lead mainly occurs through inhalation of air and ingestion of lead in food, paint, water, soil, or dust. Lead accumulates in the body in blood, bone, and soft tissue. Because it is not readily excreted, lead also can affect the kidneys, liver, nervous system and other organs. Excessive exposure to lead may cause kidney disease, reproductive disorders, and neurological impairments such as seizures, mental retardation, and/or behavioral disorders. Fetuses and children are especially susceptible to low doses of lead, often suffering central nervous system damage or slowed growth.

Thanks largely to reduced use of leaded gasoline, human exposure to lead is currently less of a problem. Today, smelters and battery plants are the major sources of lead in the air. Approximately eight areas still do not meet the NAAQS for lead.

EPA will continue a relatively low level of existing work, emphasizing the few nonattainment areas near smelters. Mandating the use of unleaded gasoline will continue to be the most effective way to prevent airborne lead. An additional 2 areas will come into compliance with the NAAQS in FY 2001.

Permits/New Source Review

EPA will make revisions to Part 70 operating permit rules to streamline permit revision procedures and will provide technical support to Regions, states, tribes and local agencies on permit program revisions. By early 2001, EPA intends, with assistance from state and local permitting authorities, to complete the first round of Part 70 permit issuances. In 2000, EPA will promulgate the new source review reform rules which simplify the new source permitting process. Beginning in 2001, EPA will enter an intensive period of training and technical support activities to ensure smooth implementation of this major regulatory reinvention effort. Also, beginning in 2001 and continuing for several years thereafter, the Agency will survey the permitting program implementation efforts and the results of industry-conducted monitoring on compliance status. The Agency will continue and expand training and technical support efforts to ensure smooth incorporation into operating permits of the Compliance Assurance Monitoring, MACT, and other rules becoming effective in 2001 and beyond. The Agency also will continue to be involved in and expand, as needed, efforts to reform and streamline permitting programs.

FY 2001 Change from FY 2000 Enacted

EPM

- (+$800,000) Additional funding is required for the personnel costs for the program.

S&T

- (-$380,000) Funding to support a National Research Council study of the Clean Air Program, an Congressional earmark in 2000, will not be continued.

Annual Performance Goals and Performance Measures

Reduce CO2, SO2, NO2, Lead

In 2001	Maintain healthy air quality for 28.8 million people living in 62 areas attaining the CO, SO2, NO2, and Lead standards, and increase by 16.4 million the number of people living in areas with healthy air quality that have attained the standard.
In 2000	Maintain healthy air quality for 27.7 million people living in 46 areas attaining the CO, SO2, NO2, and Lead standards, and increase by 1.1 million the number of people living in areas with healthy air quality that have attained the standard.
In 1999	Healthy air quality for 22.8 million people living in 33 areas attaining the CO, SO2, NO2, and Lead standards was maintained, and 4.9 million more people are living in areas with healthy air quality that have attained the standard.
In 1999	13 of the 58 estimated remaining nonattainment areas have achieved the NAAQS for carbon monoxide, sulfur dioxide, or lead.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
Total Number of People Living in Areas Designated in Attainment with Clean Air Standards for CO, SO2, NO2, and Pb	27,718,000	28,814,000	45,245,000	People
Areas Designated to Attainment for the CO, SO2, NO2, and Pb Standards	14	16	18	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the CO, SO2, NO2, and Pb Standards	4,918,531	1,096,000	16,431,000	People
CO Reduced from Mobile Sources	9,841,000	10,341,000	10,672,000	Tons
Total Number of People Living in Areas with Demonstrated Attainment of the NO2 Standard	13,000,000	13,000,000	13,000,000	People

Baseline: For SO2, Lead and CO, 107 areas with a population of 65,573,000 were classified as non-attainment or were unclassified in 1990. Through 1999, 46 of those areas with a population of 27.7 million have been redesignated to attainment. The 1995 baseline for mobile source emissions for CO was 70,947,000 tons.

Verification and Validation of Performance Measures

Performance Measure: Areas Redesignated/ Areas Maintaining Healthful Standards for CO, SO2, NO2, and Lead

Performance Database:

- AIRS —Aerometric Information Retrieval System is comprised of two major subsystems: 1) the Air Quality Subsystem (AQS) stores ambient air quality data (used to determine if nonattainment areas have the three years of clean air data needed for redesignation), and 2) the Airs Facility Subsystem (AFS) stores emissions and compliance/enforcement information for facilities.
- FREDS—The Findings and Required Elements Data System is used to track progress of states and Regions in reviewing and approving the required data elements of the State Implementation Plans (SIP). SIPs define what actions a state will take to improve the air quality in areas that do not meet national ambient air quality standards in order to be redesignated.

Data Source: AIRS: State and local agency data from monitoring stations in the State and Local Air Monitoring Stations (SLAMS). FREDS: Data are provided by EPA's Regional offices.

QA/QC Procedures: AIRS: The QA/QC of the national air monitoring program has several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections. FREDS: No formal QA/QC procedures.

Data Quality Review: AIRS: No external audits have been done in the last 3 years. FREDS: None

Data Limitations: AIRS: Some potential data limitations: 1) incomplete or missing data (*e.g.*, some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.*, faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.*, non-calibrated and non-operational monitors).

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractor(s) obtain some necessary information directly from other sources, for example weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions in several future years. When the method for estimating emissions changes significantly, EMD sometimes creates revisions to its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes on paper the national emission estimates; county-level estimates are available electronically.

It is useful to understand just what mobile source information is updated in Trends each year. An input is updated annually only if there is a convenient source of annual data for the input. Generally, VMT, the mix of VMT by type of vehicles (FHWA types, not EPA types, however), temperatures, gasoline properties, and the designs of I/M programs are updated each year. The age mix of highway vehicles is updated, using state registration data; this captures the effect of fleet turnover, assuming emission factors for older and newer vehicles are correct. Emission factors for all mobile sources and activity estimates for non-road sources are changed only when OMS requests this to be done and is able to provide the new information in a timely manner.

FREDS: Potential data limitations include incomplete or missing data from Regions.

New/Improved Data or Systems: AIRS: EPA is in the process of reengineering the AQS subsystem to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. The current AFS, which is a mainframe operation, will be replaced by a new ORACLE database that will also be accessible by the Internet. Both systems will be enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) being developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in our data base can be linked with environmental data in other Agency databases for the same facility. FREDS: None

Coordination with Other Agencies

EPA cooperates with several other federal, state and local agencies in achieving goals related to the standards for CO, SO_2, NO_2, and lead. EPA, the Department of Transportation (DOT), and the Army Corps of Engineers work with state and local agencies to help them manage growth and urban sprawl. EPA also works with DOT, local governmental organizations and non-profit groups on the promotion of transportation alternatives with the aim of reducing mobile source emissions by reducing total vehicle miles traveled. The Department of Energy (DOE) and DOT are funding

research projects to better understand the size, source, and causes of mobile source pollution. DOT's mobile source projects include Transportation Analysis and Simulation (TRANSIMS) and other transportation modeling projects. DOE is funding these projects through the National Renewable Energy Lab. EPA also works closely with DOE on refinery cost modeling analyses for EPA's clean fuel programs. For mobile sources program outreach, the Agency is participating in a collaborative effort with DOT's FHWA and Federal Transit Administration designed to educate the public about the impacts of transportation choices on traffic congestion, air quality and public health. This community-based public education initiative also includes the Centers for Disease Control. In addition, EPA is working with DOE to identify opportunities in the Clean Cities program.

Statutory Authorities

Carbon Monoxide
Clean Air Act, Titles I and II; Motor Vehicle Information and Cost Savings Act and the Alternative Motor Fuels Act of 1988 (AMFA)

Sulfur Dioxide and Permitting
Clean Air Act, Titles I and V

Nitrogen Dioxide
Clean Air Act, Titles I and II

Lead
Clean Air Act, Titles I and II

Objective # 4: Acid Rain

By 2010, reduce ambient sulfates and total sulfur deposition by 20-40 percent from 1980 levels due to reduced sulfur dioxide emissions from utilities and industrial sources. By 2000, ambient nitrates and total nitrogen deposition will be reduced by 5-10 percent from 1980 levels due to reduced emissions of nitrogen oxides from utilities and mobile sources.

Resource Summary
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request	FY 2001 Req. v. FY 2000 Ena.
Acid Rain	**$18,136.2**	**$19,632.8**	**$20,293.5**	**$660.7**
Environmental Program & Management	$10,526.5	$11,231.3	$12,685.9	$1,454.6
Science & Technology	$4,002.1	$4,332.5	$4,000.0	($332.5)
State and Tribal Assistance Grants	$3,607.6	$4,069.0	$3,607.6	($461.4)
Total Workyears	86.6	90.0	88.3	(1.7)

Key Programs
(Dollars in thousands)

	FY 1999 Enacted	FY 2000 Enacted	FY 2001 Request
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$3,607.6	$4,069.0	$3,607.6
Acid Rain -Program Implementation	$10,309.4	$10,606.3	$12,287.1
Acid Rain -CASTNet	$4,000.0	$4,000.0	$4,000.0
Administrative Services	$0.0	$208.2	$218.4

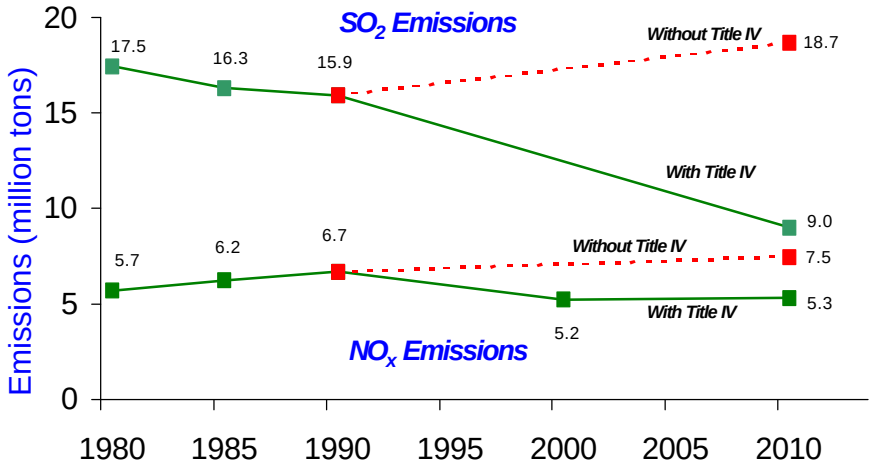
FY 2001 Request

Emissions of sulfur dioxide (SO_2, mostly from power plants and other industrial sources) and nitrogen oxides (NO_x, mostly from power plants and motor vehicles) react in the atmosphere and fall to earth as acid rain, causing acidification of lakes and streams and contributing to the damage of trees at high elevations. Acid rain also accelerates the decay of building materials and paints, and contributes to degradation of irreplaceable cultural objects such as statues and sculptures. NO_x emissions are also a major precursor of ozone, which affects public health and damages crops, forests, and materials. NO_x deposition also contributes to eutrophication of coastal waters, such as the Chesapeake and Tampa Bays. Additionally, before falling to earth, SO_2 and NO_x gases form fine particles that affect public health by contributing to premature mortality, chronic bronchitis, and other respiratory problems. The fine particles also contribute to reduced visibility, most notably in national parks.

The Acid Rain Program, authorized under Title IV of the Clean Air Act Amendments of 1990, is primarily focused on SO_2 and NO_x emissions from electric utilities, and has numerous statutory deadlines. Reductions in NO_x emissions from mobile sources are required under Title II of the Clean Air Act. The U.S. is also committed to reductions in SO_2 and NO_x emissions under the US-Canada Air Quality Agreement of 1991. EPA's Acid Rain Program uses market-based approaches to achieve these emission reductions. The Program provides affected sources with flexibility to meet required emission reductions at the lowest cost (both to industry and government). The SO_2 component features tradeable units called "allowances" (1 allowance = 1 ton of SO_2), accurate and verifiable measurements of emissions, and a cap on total emissions. The Acid Rain Program continues to be recognized as a model for flexible and effective regulation both in the U.S. and abroad.

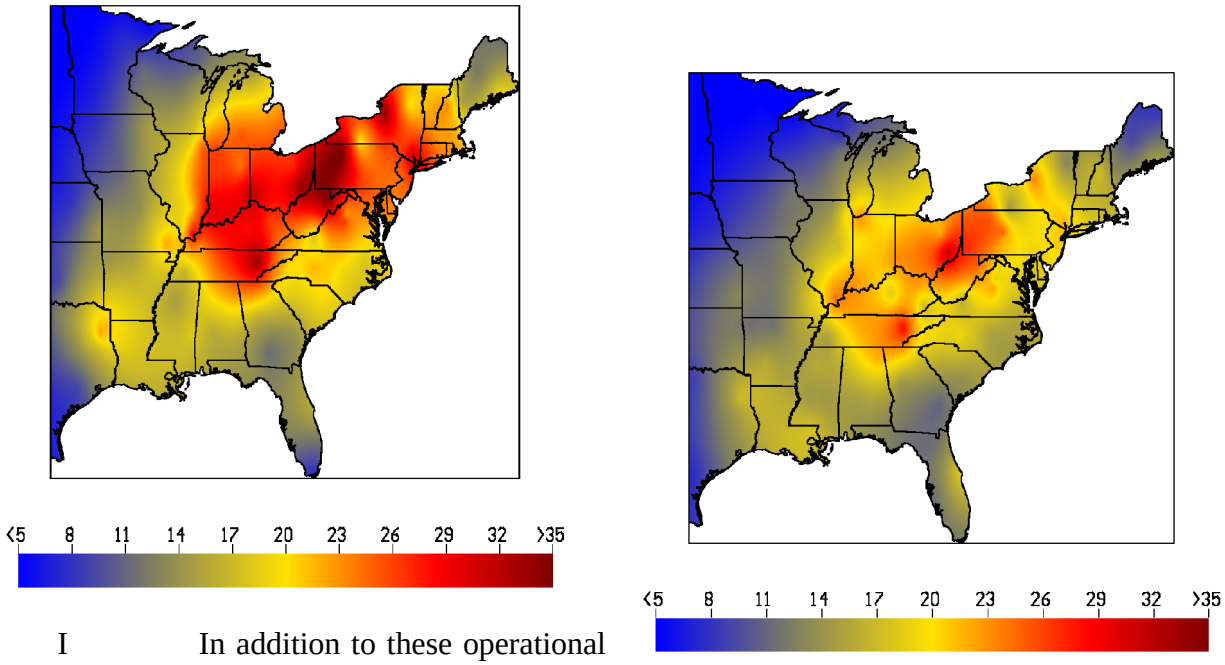
Major program activities include measurement, quality assurance, and tracking of SO_2, NO_x, and CO_2 emissions, as recorded by Continuous Emissions Monitors at more than 2,000 electric utility units; conducting field audits and certifying emissions monitors; operation of an SO_2 allowance tracking system to record transfers of emission allowances between different parties; reconciliation

Title IV -- Utility
SO_2 and NO_x Emissions Reductions



of emissions and allowances at each unit to ensure compliance; and processing of permit actions.

Phase I of the Program began in 1995 for 450 electric utility units. Phase II of the program begins in 2000 and affects approximately 2,000 utility and industrial units. Despite this increase in affected units, the number of quarterly emission reports processed (8,000 per year) will remain unchanged because Phase II electric utility units are already required to report their emissions. However, there will be more than a four-fold increase in the number of units for which EPA will conduct an annual reconciliation of allowances with measured emissions. In addition, there is likely to be a significant increase in allowance trading activities in Phase II of the program. (More than 1,000 private allowance transfers per year are currently processed, and this number is expected to triple as Phase II is implemented.) This increased workload will be handled through improved information resource management and by improving program operation and efficiency through rule revisions. In 2001, the Program will begin a three-year effort to re-engineer the information technology support structure in order to meet current and future needs. The current system is based on 1992 programming technology which has become outdated and cumbersome.



I In addition to these operational

1989-91 **1995-97**

Source: Lynch, J.A., Bowersox, V.C. and Grimm, J.W., 1999. Changes in Sulfate Deposition in Eastern U.S.A. Following Enactment of Title IV of the Clean Air Act Amendments of 1990. Submitted to *Atmospheric Environment*. In Press. (Units are in kilograms per hectare).

Sulfate Deposition in Acid Rain Reduced (kg/ha)

- These maps represent snapshots of wet sulfate deposition over time. As illustrated in the 1995-1997 map, following the 1995 implementation of the Acid Rain Program, total sulfur deposition fell in a dramatic and unprecedented reduction of up to 25% over a large area of the Eastern United States.

activities, the Acid Rain Program is responsible for managing the Clean Air Status and Trends Network (CASTNet), a dry deposition monitoring network, as well as providing critical operational support for the National Atmospheric Deposition Program (NADP) wet deposition network. These monitoring efforts play a crucial role in the Program's ongoing assessment activities, including reporting outcomes under the Government Performance and Results Act (GPRA), and fulfilling assessment responsibilities under the US-Canada Air Quality Agreement and Title IX of the Clean Air Act Amendments. In addition, the Program provides analytical support for the National Acid Precipitation Assessment Program (NAPAP), which was reauthorized under the Clean Air Act Amendments. NAPAP coordinates Federal acid deposition research and monitoring of emissions, acidic depositions, and their effects, including assessing the costs and benefits of Title IV. In 2001, the Acid Rain Program will complete work on NAPAP's 2000 Integrated Assessment Report and continue analyzing the costs and benefits of the Program for inclusion in NAPAP's 2004 Integrated Assessment Report. In addition, the Program will initiate an integrated assessment of its effectiveness in addressing visibility, fine particle, and ozone impacts resulting from Phase II operations for the Ozone Transport Region.

States also carry out activities to implement the SO_2 and NO_x portions of the Acid Rain Program, including certification and recertification of Continuous Emissions Monitors (CEMs), field audits of CEMs, and permitting activities. Some states may use their acid rain grant funds for monitoring activities to help assess the effectiveness of the program in reducing environmental risks.

FY 2001 Change from FY 2000 Enacted

EPM

- (-$237,500) Funding to support Southern Appalachian Mountain Institute, a Congressional earmark in 2000, will not be continued.
- (+$600,000) Funding will be used for program evaluation and development.
- (+$800,000) Funding will be used to implement system modernization and enhancements to the Acid Rain Data System.

S&T

- (-$237,500) Funding to support acid rain research at the University of Vermont, a Congressional earmark in 2000, will not be continued.
- (-$95,000) Funding to support a National Research Council study of the Clean Air program, a Congressional earmark in 2000, will not be continued.

Annual Performance Goals and Performance Measures

Reduce SO2 Emissions

In 2001	5 million tons of SO2 emissions from utility sources will be reduced from the 1980 baseline.
In 2000	5 million tons of SO2 emissions from utility sources will be reduced from the 1980 baseline.
In 1999	On-track to achieve APG. End-of-year FY 1999 data will not be available until late 2000.

Performance Measures:	FY 1999	FY 2000	FY 2001

	Actuals	Estimate	Request	
SO2 Emissions		5,000,000		Tons Reduced
NOx Reductions	30-Oct-2000			Tons Reduced

Baseline: The base of comparison for assessing progress on the 2001 annual performance goal is the 1980 emissions baseline. The 1980 SO2 emissions inventory totals 17.5 million tons for electric utility sources. This inventory was developed by National Acid Precipitation Assessment Program (NAPAP) and used as the basis for reductions in Title IV of the Clean Air Act Amendments. This data is also contained in EPA's National Air Pollutant Emissions Trends Report.

Reduce NOx Emissions

In 2001 2 million tons of NOx from coal-fired utility sources will be reduced from levels before implementation of Title IV of the Clean Air Act Amendments.

In 2000 2 million tons of NOx from coal-fired utility sources will be reduced from levels before implementation of Title IV of the Clean Air Act Amendments.

Performance Measures:	FY 1999 Actuals	FY 2000 Estimate	FY 2001 Request	
NOx Reductions Reduced		2,000,000	2,000,000	Tons

Baseline: The base of comparison for assessing progress on the 2001 annual performance goal is emissions levels of coal-fired utility sources before implementation of Title IV of the Clean Air Act Amendments. Emissions levels that would have resulted without implementation of Title IV of the CAAA were based on projection of NOx emissions assuming growth without additional controls.

Verification and Validation of Performance Measures

Performance Measure: SO_2 and NO_X emission reductions

Performance Database: Emissions Tracking System (ETS) (SO_2 and NO_X emissions from Continuous Emission Monitoring Systems (CEMS)); CASTNet (dry deposition); NADP (wet deposition)

Data Source: On a quarterly basis ETS receives hourly measurements of SO_2, NO_x, volumetric flow, CO_2, and other emission-related parameters from more than 2,000 units affected by Title IV. The CASTNet measures particle and gas acidic deposition chemistry. Specifically, CASTNet measures sulfate and nitrate dry deposition and meteorological information at approximately 70 active monitoring sites. CASTNet is primarily an eastern, long-term dry deposition network funded and operated by EPA/OAR. The database is maintained by OAR. The National Atmospheric Deposition Program (NADP) is a national long-term wet deposition network that measures precipitation chemistry and provides long-term geographic and temporal trends in concentration and deposition of major cations and anions. Specifically, NADP provides measurements of sulfate and nitrate wet deposition at approximately 200 active monitoring sites. EPA, along with several other federal agencies, states, and other private organizations, provides funding and support for NADP. The NADP database is maintained by the Illinois State Water Survey/University of Illinois.

QA/QC Procedures: Our QA/QC requirements dictate performing a series of quality assurance tests of CEMS performance. For these tests, emissions data are collected under highly structured, carefully designed testing conditions, which involve either high quality standard reference materials or multiple instruments performing simultaneous emission measurements. The resulting data are

screened and analyzed using a battery of statistical procedures, including one that tests for systematic bias. If the CEMS fails the bias test, indicating a potential for systematic underestimation of emissions, then either the problem must be identified and corrected or the data is adjusted to prevent the low bias. CASTNet has established data quality objectives and quality control procedures for accuracy and precision. NADP has established data quality objectives and quality control procedures for accuracy, precision and representativeness. The intended use of these data is to establish spatial and temporal trends in wet deposition and precipitation chemistry.

Data Quality Review: The ETS provides instant feedback to sources in order to identify any data reporting problems. EPA staff then conducts data quality review on each quarterly ETS file. In addition, states or EPA staff conduct random audits on selected sources' data submission. CASTNet underwent formal Agency peer review by an external Panel. The NADP methods of determining wet deposition values have undergone extensive peer review, handled entirely by the NADP housed at the Illinois State Water Survey/ University of Illinois. Assessments of changes in NADP methods are developed primarily through the academic community and reviewed through the technical literature process.

Data Limitations: None

New/Improved Data or Systems: In order to improve the spatial resolution of the Network (CASTNet), additional monitoring sites are needed.

Coordination with Other Agencies

EPA participates with the National Acid Precipitation Assessment Program (NAPAP), which coordinates Federal acid rain research and monitoring under the auspices of the National Science and Technology Council Committee on Environment and Natural Resources. NAPAP prepares a biennial report which evaluates the costs, benefits, and effectiveness of the Acid Deposition Control Program under Title IV of the 1990 Clean Air Act Amendments. The NAPAP assessment is a multi-agency effort requiring cooperation and coordination between EPA, the Department of Energy, the Department of Agriculture, the Department of the Interior, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration.

Statutory Authorities

Clean Air Act (CAA) Titles I and IV (42. U.S.C. 7641-7642)